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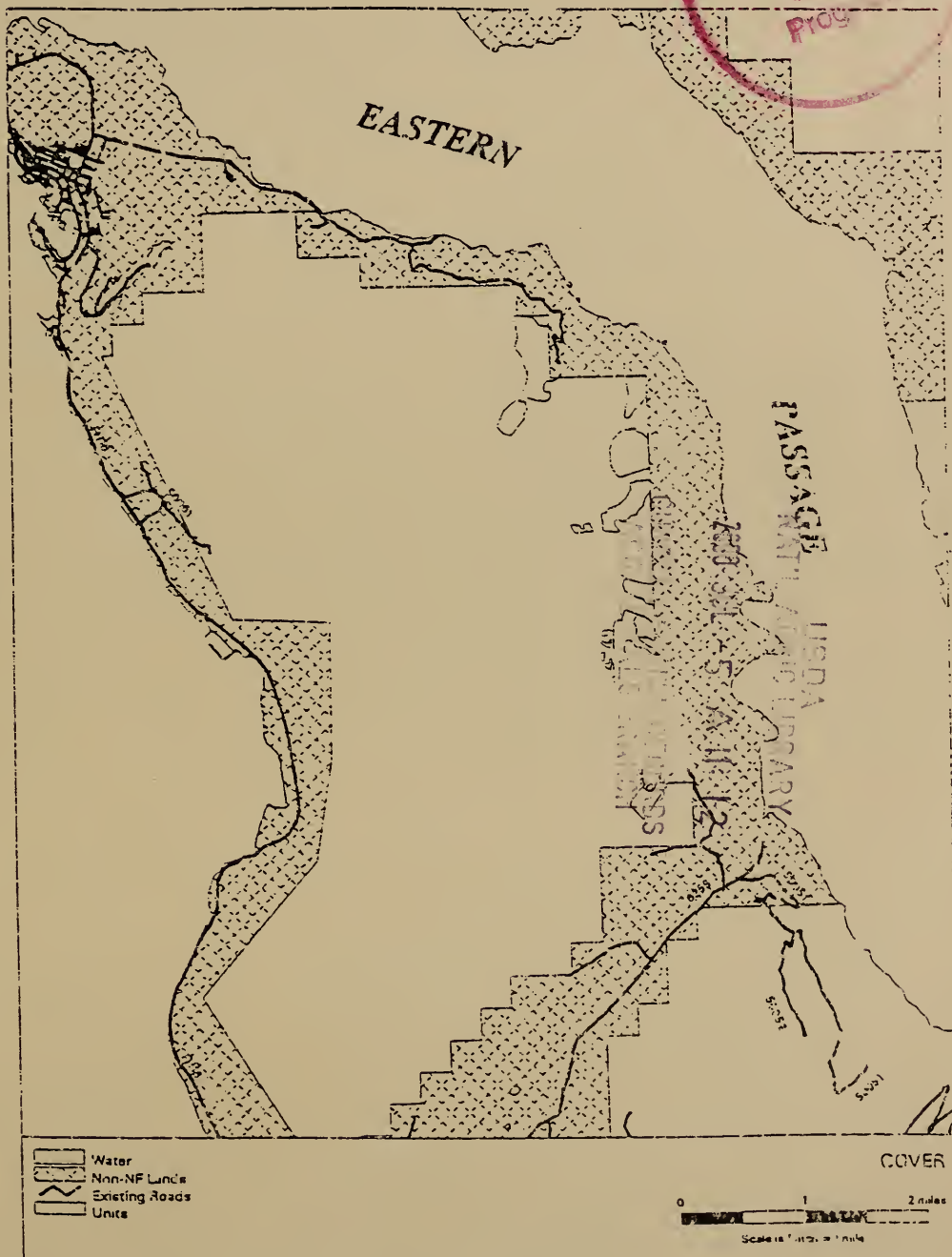
Tongass National Forest

Publication No. R10-MB-411

April 2000

Doughnut Timber Sale

Environmental Assessment



Doughnut Timber Sale

Environmental Assessment

United States Department of Agriculture
Forest Service – Alaska Region

Lead Agency:

USDA Forest Service
Tongass National Forest

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Abstract:

The USDA Forest Service proposes to make approximately 2 to 8 million board feet of timber available for harvest within the Doughnut Project Area on the Wrangell Ranger District, within the Tongass National Forest. The actions analyzed in this Environmental Assessment are designed to implement direction contained in the Modified 1997 Tongass Land and Resource Management Plan (TLMP). This Environmental Assessment describes the effects of five "action" alternatives and one "no action" alternative for harvesting timber within the Doughnut Project Area on Wrangell Island.

File Code: 1950

Date: April 3, 2000

Dear Reviewer:

Here is your copy of the Environmental Assessment (EA) for the Doughnut Timber Sale on the Wrangell Ranger District of the Tongass National Forest. This document describes one no-action alternative and five action alternatives ranging from approximately 2 to 8 million board feet of timber harvest. Alternative 6, which proposes harvest of approximately 5 million board feet, is our preferred alternative.

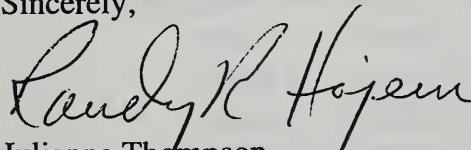
The comment period on the EA will be a minimum of 30 days from the date of publication of the notice of availability in the *Wrangell Sentinel*, anticipated to be April 6, 2000. The deadline for comments is anticipated to be May 8, 2000. The Decision Notice is expected to be completed in June 2000.

Federal court decisions have established that reviewers of environmental analysis must structure their participation so that it is meaningful and alerts an agency to the reviewer's position and contentions. Environmental objections that could have been raised at the environmental analysis stage may be waived if not raised until after completion of the Decision Notice. This is so substantive comments and objections are made available to the Forest Service at a time when it can meaningfully consider them and respond to them in the Decision Notice.

Carol Jorgensen, the Assistant Forest Supervisor, is the official responsible for this project. The Assistant Forest Supervisor will be deciding whether or not timber harvest will occur in the Doughnut project area at this time. Furthermore, if timber harvest does occur, she will be deciding where and how it occurs, if and where roads and log transfer facilities are developed, and what mitigation measures are required.

Please send written comments to Wrangell District Ranger or Quinn Carver, Team Leader, Attn.: Doughnut EA, USDA Forest Service, P.O. Box 51, Wrangell, AK 99929; or to the e-mail address: qcarver@fs.fed.us. You may also call (907) 874-2323 for additional information or if you would like additional copies of the EA.

Sincerely,


for Julianne Thompson
Acting Wrangell District Ranger



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Chapter 1:

Purpose and Need

Introduction: This Document and You

Thank you for your interest in the proposed Doughnut Timber Sale. This Environmental Assessment (EA) was prepared by the Wrangell Ranger District of the Tongass National Forest to document our efforts to make decisions about a possible timber sale within the Doughnut Project Area based upon laws and other direction and upon public needs and concerns. The decision for the Timber Sale would normally be within District Ranger authority, but with the addition of the Old Growth Reserve Amendment, the decision authority has been elevated to the Assistant Forest Supervisor level. Therefore, based upon this Environmental Assessment (EA), the Assistant Forest Supervisor will make the final decision, which will be documented in a Decision Notice.

This document outlines the effects of a proposed timber sale on Wrangell Island, known as the Doughnut Timber Sale. In this document we describe the "proposed action" and four alternative strategies for harvesting timber as well as a "no action" alternative. Some of these strategies also include building and maintaining roads. We have disclosed the environmental effects and resource outputs that we expect from the proposed action and each of the alternatives.

We also disclose the effects of a proposed modification to the Pats Small Old-growth Reserve. The Forest Plan directs us to evaluate the size, spacing and habitat composition of mapped reserves that are within or adjacent to project areas during project-level environmental analysis (Forest Plan, page 3-82). Based on the analysis in this EA, the Assistant Forest Supervisor may decide to modify the Pats Small Old-growth Reserve.

This Environmental Assessment (EA) documents the need for the proposed action, the alternatives including the proposed action, and the environmental impacts of the alternatives. It is prepared according to the National Environmental Policy Act (NEPA) and Forest Service Handbook 1909.15. The EA also provides sufficient evidence and analysis for determining whether to prepare an Environmental Impact Statement (EIS) or a Finding Of No Significant Impact (FONSI) with a Decision Notice.

The planning record, including reference documents such as Tongass Land and Resource Management Plan (Forest Plan), the Tongass Timber Reform Act are available at the Wrangell Ranger District office in Wrangell, Alaska. Other reference documents such as the Tongass Land and Resource Management Plan (Forest Plan), the Tongass Timber Reform Act, the Resources Planning Act, and the Alaska Regional Guide, are available at public libraries around the region as well as at the Supervisor's Offices in Petersburg, Ketchikan and Sitka.

The Forest Service has prepared this Environmental Analysis (EA) on the potential effects of timber harvest in the Doughnut Project Area in compliance with the National Environmental Policy Act (NEPA) and other relevant federal and state laws and regulations. This EA incorporates documented analyses by summarization and reference where appropriate.

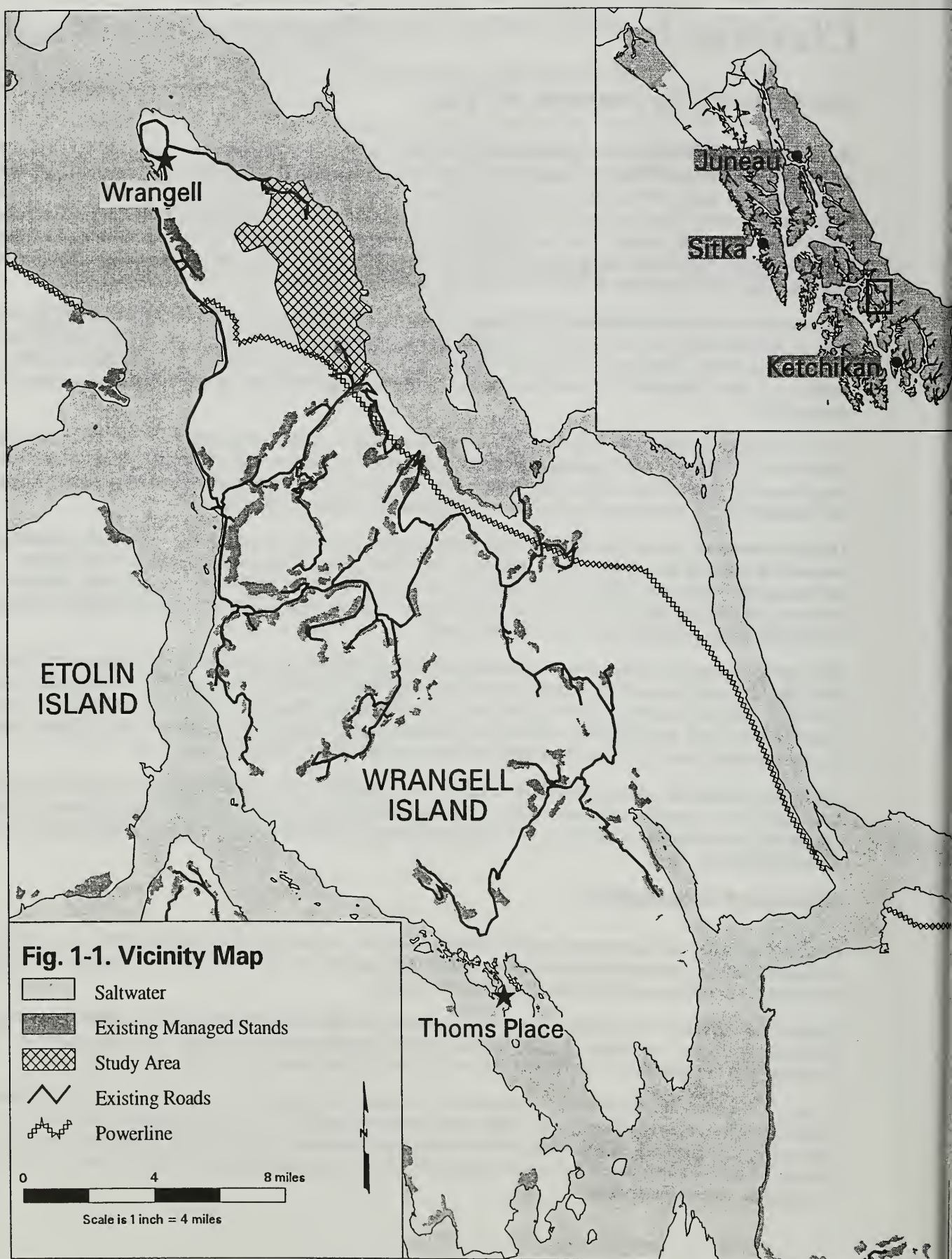
Document Organization

Chapter 1 provides the purpose and need for the project we are proposing. It discloses the public issues surrounding the action. Introductory information is also provided. This chapter also discusses how the Doughnut project relates to the 1997 Forest Plan and 1999 Record of Decision (ROD).

Chapter 2 describes how alternatives were developed and how they respond to key issues as identified through public involvement. Our proposed action and alternatives, including the required No Action alternative, are described and we provide a comparison of alternatives for the Doughnut project at the end of Chapter 2.

Chapter 3 describes the affected environment and environmental consequences in relation to the issues identified in Chapter 1. The predicted changes to the affected environment likely to occur with implementation of the alternatives are disclosed. These changes include both direct and indirect impacts of the alternatives upon the human and natural environment for each resource issue. Past, present, and reasonably foreseeable actions are disclosed as cumulative effects.

1 Purpose and Need



Location

The Doughnut Project Area is located on Wrangell Island, in Southeast Alaska approximately 7 miles east of Wrangell, Alaska (Figure 1-1). The project area includes approximately 3,800 acres of National Forest lands, and is located in Township 63 South, Range 84 East, Copper River Meridian. The project area includes portions of Value Comparison Units (VCU) 475 and 476. The Doughnut Project Area overlaps between the North Wrangell and Pat Landscape Areas as described in the 1998 Wrangell Island Analysis (USDA 1998).

Proposed Action

What is meant by the "Proposed Action" – At the beginning of project planning, we define a "Proposed Action". This "Proposed Action" is developed based upon our knowledge of the area and is guided by goals and objectives outlined in the 1997 Forest Plan. This serves as a starting point for people to comment upon by showing the public and other agencies what we are considering. We then develop alternatives to the proposed action in response to environmental issues, concerns, and comments we receive from interested publics and other agencies. The "Proposed Action" identified at the beginning of the project is not necessarily the "preferred" or "selected" alternative. The Responsible Official must weigh biological, physical, and social factors in finally determining the "selected" alternative.

The Wrangell Ranger District of the Tongass National Forest proposes to make approximately 8 million board feet (mmbf) net saw timber and utility wood available for harvest within the Doughnut Project Area. Approximately 2.4 miles of road would be constructed in cooperation with Alaska Department of Natural Resources, as most of the construction would occur on DNR land. This new road system would service both DNR and Forest Service access needs. All volume would be trucked to Wrangell for processing or saltwater transfer. This action also proposes a Non-significant Forest Plan Amendment to adjust the Pats Old Growth Reserve. None of the timber sale alternatives propose harvest units in areas that are under consideration for old-growth reserve expansion.

Relationship to Forest Plan

National forest planning takes place at several levels: National, regional, forest, and project levels. The Doughnut EA is a project-level analysis; its scope is confined to addressing the key issues and possible environmental consequences of the project. It does not attempt to address decisions made at higher levels. It does, however, implement direction provided at those higher levels.

The Forest Plan embodies the provisions of the National Forest Management Act, its implementing regulations, and other guiding documents. The Forest Plan sets forth in detail the direction for managing the land and resources of the Tongass National Forest. The Forest Plan is the result of extensive analysis, which is addressed in the Forest Plan Final EIS and the April 1999 Record of Decision. Where appropriate, the Doughnut EA tiers to the Forest Plan FEIS, as encouraged by 40 CFR 1502.20.

The Forest Plan uses land use designations to guide management of the Tongass National Forest. Each designation provides for a unique combination of activities, practices and uses. The National Forest lands within the Doughnut project area are entirely allocated to the Scenic Viewshed Land Use Designation (LUD). The Old Growth Habitat LUD is also of concern in this project, as modification of the Pats Old Growth Reserve is considered. Goals, objectives and desired future conditions of each LUD are summarized below. The Forest Plan (Chapter 3) contains a detailed description of each land use designation.

Scenic Viewshed - Management activities are not visually apparent to the casual observer in the near distance from visual priority travel routes and use areas. In the middle to background distance, activities are subordinate to the landscape character of the area. Timber harvest is allowed and roads are permitted.

Old-growth Habitat - Manage the area to maintain a diversity of old-growth conifer habitats in their natural condition to favor old-growth associated fish and wildlife species. No timber harvesting will be scheduled and roads will be located outside the area when possible.

Other Ownership – Decisions included within the Doughnut project may have direct implications upon lands of Other Ownership, as the project area is adjacent to state and private lands. There are 2,270 acres of State and private land located along the eastern edge of the Doughnut Project Area. This is not a designated LUD in the Forest Plan. However, for purposes of this EA, Other Ownership designates areas within the project area, which are controlled by other interests. The Forest Service does not make decisions concerning the management of these lands, but

1 Purpose and Need

potential future management on these lands is considered in the cumulative effects of this project.

Table 1-1 gives the acreages within the project area of each land use designation, and of lands in state or private ownership.

Table 1-1 Project Area Land Use Designations and Non-National Forest Acreages

Scenic Viewshed	Other Ownership	Total Acres
3,794 acres	2,270 acres	6,064 acres

The following standards and guidelines delineate spatial areas not available for programmed timber harvest within land use designations that are otherwise available. Each applies to a specific habitat or ecological component. These areas are included within the Scenic Viewshed designation described above. Detailed information about these and other standards and guidelines is included in the Forest Plan, Chapter 4.

Goshawk Nesting Habitat – Maintain an area of not less than 100 acres of productive old-growth forest (if it exists) generally centered over the nest tree or probable nest site.

Riparian Management Areas – Riparian Management Areas are areas of special concern regarding fish, other aquatic resources, and wildlife. These areas are delineated according to the process-group direction in the Riparian Forest-wide Standards and Guidelines (Forest Plan, pp 4-56 to 4-73). Timber harvest is not scheduled in Riparian Management Areas.

High Hazard Soils – High Hazard Soils are those soils where the slopes are overly steep and there is a high risk of management induced slope failure. Timber harvest units have been located to avoid such areas and manage timber yarding to minimize disturbance on v-notch slopes. Potential road locations have avoided areas with unstable soils to prevent the potential for mass soil movement.

Project Area Desired Future Condition

The desired future conditions described for the Forest Plan land use designations, in conjunction with the other Forest Plan direction outlined above, provide the parameters for identifying and defining project-specific desired future conditions. The following desired future conditions will help guide management of the project consistent with the Forest Plan, the significant issues (described below), and the ecological conditions of the project area.

In the Doughnut project area, forest visitors, recreationists, and others using popular identified travel routes will view a natural-appearing landscape on National Forest lands. Activities will be sensitive to management of adjacent state and private lands and, in the foreground, not evident to the casual observer. Activities in the middle ground and background will be subordinate to the characteristic landscape. Within these viewsheds, timber harvest units are typically small and affect only a small percentage of the seen area. At any given point in time, roads and other structures are not visually evident or are subordinate to the landscape. A variety of successional stages providing wildlife habitat occur, although late successional stages predominate. Recreation and tourism opportunities in a range of settings are available. In the areas managed for Retention or Partial Retention VQO's, timber yields will generally be obtained through the use of small openings, high retention, and/or uneven-aged harvest systems. A yield of timber is produced which contributes to Forest-wide sustained yield and responsive to local markets.

The desired future condition has been further refined through the consideration of design objectives within the North Wrangell and Pat Landscape Units of the Wrangell Island Analysis (1998). Objectives defined in the Wrangell Island Analysis are not legally binding, but represent a considerable amount of collaborative planning with the citizens and communities of Wrangell Island. They are included here in an effort to tie those efforts to the Forest Plan and honor those efforts.

- Meet partial retention objectives for timber harvest as seen from the Zimovia Highway and surrounding small boat, ferry, and cruise ship routes. Use harvest on National Forest to soften visual impacts of harvest on adjacent non-National Forest lands where possible. (Wrangell Island Analysis, pages 17 & 23)
- Work with the state and city to develop road management objectives of mutual interest and agreements for management of access into mixed ownership areas. (Wrangell Island Analysis, page 17).

- Work with state and city on road management objectives and use and maintenance agreements where non-National Forest roads are used to access National Forest resources. (Wrangell Island Analysis, page 23)
- Work with state agencies to conduct road condition surveys, landslide surveys, and develop cooperative watershed restoration projects. (Wrangell Island Analysis, pages 23)
- Limit further disturbance in Pat and Hermit watersheds unless mitigated by watershed restoration activities. Consider road closures to reduce road density and erosion. (Wrangell Island Analysis, page 23)
- Maintain access for snow machines, scenic driving, and other recreation uses. (Wrangell Island Analysis, page 23)
- Maintain north/south corridors for wildlife dispersal. (Wrangell Island Analysis, page 23)
- Manage national forest lands to protect downstream drinking water supplies where such uses occur. (Wrangell Island Analysis, page 17)

Purpose and Need

The Doughnut project is proposed at this time to respond to goals and objectives of the Tongass Forest Plan, and to help move the project area towards future conditions described in that plan. The Forest Plan includes forest-wide goals and objectives, area-specific (land use designation) goals, objectives, and desired future conditions.

Volume from small timber sales contributes to a wide range of natural resource employment opportunities. Volume also contributes to meeting annual market demand for Tongass National Forest Timber. The small timber sales can also provide lower investment projects suitable for the smaller size business entities in the Southeast Alaska timber industry. Timber sale projects included in this Environmental Analysis are included in the Wrangell Ranger District Small Sales category on the Tongass National Forest 10 Year Timber Sale Action Plan.

Preliminary analysis indicates, as much as 1,648 acres and 38.8 million board feet of timber could be available for harvest from the project area at this time. Appendix D of this document provides information on how this project relates to the overall Tongass timber sale program, and why the project is being scheduled at this time.

The Forest Plan desired future condition for the Land Use Designations (LUDs) in the project area are,

- Manage the timber resource for production of saw timber and other wood products from suitable timber lands made available for timber harvest; on an even-flow, long-term sustained yield basis and in an economically efficient manner (Forest Plan, page 2-4);
- Seek to provide a timber supply sufficient to meet the annual market demand for Tongass National Forest timber, and the demand for the planning cycle (Forest Plan, page 2-4);
- Provide Forest visitors with visually appealing scenery, with an emphasis on areas seen along the Alaska Marine Highway, State highways, major Forest roads, and from popular recreation places; recognize that in other areas where landscapes are altered by management activities, the activity may visually dominate the characteristic landscape. (Forest Plan, page 2-4); and
- Provide a diversity of opportunities for resource uses that contribute to the local and regional economies of Southeast Alaska (Forest Plan, page 2-3).
- Support a wide range of natural-resource employment opportunities within Southeast Alaska communities (Forest Plan, page 2-3)
- Maintain a Forest-wide system of old-growth forest habitat to sustain old-growth associated species, and ensure that the reserve system meets the minimum size, spacing and composition criteria in Appendix K (Forest Plan, page 2-3).

1 Purpose and Need

Decisions to be made

The decision for the Timber Sale would normally be at the District Ranger authority, but with the addition of the Old Growth Reserve Amendment, the decision authority has been elevated to the Assistant Forest Supervisor level. Therefore, based on the environmental analysis in this EA, the Assistant Forest Supervisor will decide: (1) if, where, and how much timber harvest should occur in the project area at this time; and if so, (2) where road development should occur to facilitate harvest; and (3) what mitigation measures and monitoring would be implemented.

The Assistant Forest Supervisor will also decide what changes, if any, will be made to the size and/or location of the North Wrangell and Pats Creek Old-growth Habitat Reserves. If a change is made, it will likely be a non-significant amendment to the Forest Plan (Forest Plan, pages 3-82 and 5-3).

Public Involvement

When a project such as this begins, we organize a group of individuals with a variety of educational backgrounds and experience to form a team. This team is known as an "Interdisciplinary Team" or IDT. The Doughnut IDT read and listened to public comment, worked with State agencies and other Federal agencies, and you in an effort to develop the best possible project. The IDT conducted the planning process and wrote this document to inform you and the Deciding Officer of the environmental and social consequences of the proposed action and alternatives.

Public Scoping

"Public Scoping" is a term we use to describe the process of identifying the issues and concerns surrounding a project by contacting you, the public, and various State and Federal agencies. This helps us to engage you and other agencies throughout the planning process to produce a quality project.

In addition to the following specific activities, the Doughnut project has been listed on the Tongass National Forest Schedule of Proposed Actions since October 1998, and included in the Tongass National Forest 10-Year Timber Sale Action Plan since 1998, both available on the Internet. In addition, the Doughnut project was included in the Wrangell Island Analysis (1998). To date, the public has been invited to participate in the project in the following ways.

Public Mailing - On January 28, 1999, a letter providing information and seeking public comment was mailed to approximately 81 individuals and groups that had previously shown interest in Forest Service projects in Southeast Alaska. This included federal and state agencies, Alaska Native groups, municipal offices, businesses, interest groups, and individuals. A total of 17 responses to this initial mailing were received. There were 13 responses from groups and/or individuals and 4 responses from other state and/or federal agencies. As a result of initial scoping the project area was adjusted. A second letter reflecting those changes was sent to the same mailing list in November of 1999. There were 5 responses from this effort.

Local News Media - Announcements about the project were printed in the Wrangell Sentinel.

Public Meetings - Public meetings were held in conjunction with the Wrangell Island Analysis in November 1998, which included discussions of local concerns and interests that should be addressed in the Doughnut project analysis. On February 2, 1999 we met with Alaska Department of Fish and Game and the U.S. Fish and Wildlife Service, and discussed issues that should be addressed. On April 8, 1999, we held a coordination meeting with the Wrangell IRA, the federally recognized tribal government.

Key Issues

These issues were identified from the public and internal scoping. Key Issues are used to formulate and compare alternatives because of the geographic distribution, the duration of the effects, or the intensity of interest or resource conflicts. These issues are displayed in no particular order. Numbers assigned do not indicate a level of importance or level of concern. Each issue has been condensed to an issue statement. The issue statement is followed by a summary of the comments, which develop the issue, followed by a measurement section. The measurement section displays how we have responded to the issue. Some issues are more complex and will require some background to provide for better understanding, which has been included.

Issue 1 - Scenery

Issue Statement - The degree to which each alternative (harvest and road management) affects the scenery from the Eastern Passage and the resulting effects to recreation and tourism in the area.

Comment Summary - Comments expressed a concern regarding the impact upon recreation and area tourism resulting from timber harvest and road construction effects upon scenery.

Sample Comment:

- "Helicopter harvest only. Roads would detract from scenic viewing."

Measurement - The resulting scenery for each alternative will be described as a degree of change from the current scenic condition, as well as the expected Visual Quality Objective to be achieved.

Issue 2 - Economics

Issue Statement - The issue is to provide timber sales to supply wood to society while creating viable small to medium timber sale offerings on Wrangell Island for the local economy. The economic viability of sale offerings is affected by; a.) The type and quantity of wood offered; b.) Logging system requirements, c.) Road building requirements and difficulty of construction; d) the prescription (or type of cutting used) to achieve desired stand objectives; e.) Mitigation measures used and the difficulty or expense to implement required mitigations and; f.) Market conditions and length of sale life.

Comment Summary - Several comments were received which recognized the costs associated with helicopter harvest as often prohibitive. Other comments suggested that harvest volumes per acre and recovery costs per mile of road construction were important aspects to consider in the sale design. Group selection and individual tree selection were discouraged unless needed to meet the visual objectives. It was also the impression of one comment that the southeast Alaska mills were operating at 50% of their capacity. Scoping revealed numerous comments, which indicated projects economics should be an important consideration.

Other aspects of economic consideration include the relationship of harvest volume and its effect upon other resource values, i.e. visuals, streams, wildlife habitat, soils.

Sample Comments:

- "The F.S should consider the volume per acre and recovery per mile of road when making its final decision."
- "Including helicopter options in this size timber sale drives the cost too high..."

Measurement - Alternatives will be compared to provide for a sale offering of such volume and value to realize a net positive, project specific economic analysis. Additionally, all measures needed to minimize effects will be realized. Sale economics will largely influence which alternative is selected. Other resource values will serve to refine the alternative to the point where it is environmentally, economically, and socially viable and compatible.

Issue 3 - Wildlife Habitat

Issue Statement - The size and location of the two small old-growth reserves adjacent to the project area is an important issue in the design of this timber sale. Old-growth reserves and corridors are included in the Forest Plan as a strategy for maintaining biodiversity and viable wildlife populations. The Forest Plan directs us to conduct an analysis of small reserves at the project level. Road development and the future use of roads effects game species such as deer, wolf and marten. Changes in the quality and distribution of deer winter range along with new road access can effect local deer populations and subsistence use. State timber harvesting within the beach fringe decreases the value of these areas as forested corridors and increases the importance of National Forest System lands to wildlife movement. We located a Northern Goshawk nest in the Project Area – a species sensitive to timber harvesting and human disturbance. The cumulative effects of State and Forest Service timber harvesting and road-building on wildlife habitat in this area needs to be evaluated.

Comment Summary - Comments received include a concern for cumulative effects upon old growth habitat, road management, fisheries and wolves on national forest as well as land under other ownership. Comments indicated a

1 Purpose and Need

concern that the project area is highly fragmented by past management and that breaks in forested wildlife travel corridors are numerous.

One comment suggested that construction and perpetual use of the road system would substantially alter the character of the area, and can degrade fish and wildlife habitat. The development of an alternative which avoids clearcutting was suggested as a means of retaining important elements, such as multi-storied canopies; diverse understory vegetation; adequate, but not excessive, down woody material; and large snags.

A portion of the project area was also noted as high value marten habitat where Forest Plan standards and guidelines would apply.

Sample Comments:

- "as with all logging there will be a loss of habitat that we feel is unacceptable"
- "No new logging roads, no clearcutting, no interference with streams. No more nibbling away, getting closer and closer to old growth reserves".

Measurement The Pats and North Wrangell Old-growth reserves will be evaluated to determine if they are sufficient in size, productive old growth and wildlife habitat values. Road density will be measured at two scales and through time to consider implications to game species. We will compare the amount of high value habitat remaining by alternative following this sale and in the future for two management indicator species: deer and marten. To look at subsistence, we will compare changes in deer habitat capability (deer numbers), access and potential competition.

Issue 4 - Access Management

Background – The proposed Doughnut project is different from many projects in that the only road access to it is through Alaska Department of Natural Resources (DNR) lands. The DNR is currently harvesting their timber resources adjacent to the Doughnut project area, having constructed road and harvested timber south and north of the project area. Extending the DNR road from the south to access the project area is not only the most economical and least impactful route; it is the only feasible location from that direction. While different amounts of specified road are analyzed within the alternatives, all proposed locations travel across DNR lands to a proposed harvest unit and then traverse along the National Forest boundary.

Under the maximum road development alternative which extends the DNR road from the south, and when the DNR completes planned road development from the north, it is possible that the two roads could be within one-half mile of being connected. Although there is some public support for a connecting loop road in this area, the DNR has indicated that they have no plans for road development in the foreseeable future. Based upon conversations with the DNR, road construction standards would be the minimum necessary for harvest and silvicultural purposes. Connection of a loop road is not part of the purpose and need for the proposed project. Any future action by another agency regarding a connection on DNR lands is outside the scope of this analysis.

Issue Statement – Public comments were received which questioned road construction, supported road construction, encouraged location that allows a loop road connection, and favored increased roaded recreation access. Both the direct and indirect effects of road construction on water, visual quality, soils, wildlife, and recreation were a concern. Roads can result in increased recreation access. Some considered this a positive effect and looked forward to opportunities provided by improved access. Others thought that road construction would result in increased erosion, sedimentation, and degraded water quality.

Comment Summary - Public scoping revealed a high level of interest, from the city of Wrangell government and the local community, in the road being developed in a manner that would some day make it possible/feasible for connection.

Sample Comments:

- "A connection to the Wrangell East road system would give the young people an area to go snowmobiling."
- "I hope the additional roads eventually lead to a complete loop..."
- "We would like the U.S. Forest Service to thoroughly consider the road construction alternative that will enable the link with Pats Creek road."

Measurement – Two measurable factors will be used to compare alternatives for this issue; 1) Miles of road open to motorized use and 2) Contribution to a Pat's Creek loop connection. Alternatives will be evaluated based upon resource planning needs of the State of Alaska and Forest Service, in addition to recreational interests of the public. Considerations for this include measuring qualitative factors, such as public demand, against more quantitative factors, such as open road density thresholds.

Comments Outside the Scope of This Analysis

There were two comments submitted that were partially or wholly outside of the scope of this analysis. The first of these two was regarding the construction of a boat ramp. There is no part of this proposal that considers the construction of a boat ramp. The second comment was regarding the connection of the Pats Loop. Since nearly all of the existing road is located on Alaska DNR lands, connection of the loop road is outside of the decision authority of the Forest Service to implement and will not be considered in our alternatives. However, the completion of the loop will be considered in our cumulative effects analysis as reasonably foreseeable. This is due to the close proximity to National Forest System lands and the potential for such a road to change the level and use on National Forest System lands.

Other Environmental Considerations

In addition to the "key issues", there are other concerns that were brought up by the public or which otherwise must be disclosed by law. Effects analysis of these other resource values will be disclosed in Chapter III. Although these other concerns are not considered "key issues", some are connected to the key issues and all are considered in the analysis. Those other resource values include:

1. Subsistence
2. Forest Soils
3. Wetlands
4. Fisheries, Watersheds and Marine Resources
5. Heritage Resources
6. Air Quality
7. Consumers, Civil Rights and Women
8. Roadless Areas

During the initial planning stages, we became concerned about *cumulative watershed effects in Hermit Creek*. The Hermit Creek watershed has a relatively high level of timber harvest, roads, and landslides when compared to other Wrangell Island watersheds (USDA Forest Service, 1998). *Watershed cumulative effects* was eliminated as a key issue after all new roads and most of the timber harvest proposed in the Hermit Creek watershed were dropped from further consideration from all alternatives of the Doughnut Timber Sale. Nevertheless, due to the likelihood of drainage structure replacement in Hermit Creek and timber haul on existing roads through the Hermit and Pat Creek watersheds; we examine the issue within the Watershed section of this document.

Federal and State Permits, Licenses, and Certifications

U.S. Fish and Wildlife Service and National Marine Fisheries Service

We have completed Biological Evaluations for the Doughnut project area and they are available in the planning record. Coordination with U.S. Fish and Wildlife Service began with initial scoping and will continue throughout the project. As a result of the Biological Evaluation, it was determined that none of the action alternatives would likely impact any Threatened or Endangered species listed under the Endangered Species Act (Forest Service Manual 2670).

The Magnuson - Stevens Fishery Conservation Act (1996) requires that all federal agencies consult with the

1 Purpose and Need

National Marine Fisheries Service (NMFS) when any project “may adversely affect” essential fish habitat (see Chapter 3). This EA contains an assessment of the effects upon essential fish habitat and makes a determination that essential fish habitat is “not likely to be adversely affected” by the implementation of alternatives displayed for this project. No additional consultation with NMFS is required unless they disagree with this determination.

US Army Corps of Engineers (COE)

A permit from the COE incorporates requirements for the Clean Water Act and the Rivers and Harbors Act. It also includes U.S. Environmental Protection Agency (EPA) permits for pollution discharge elimination and spill prevention control and countermeasures. This permit covers the Alaska Department of Environmental Conservation (DEC) Certificate of Reasonable Assurance for compliance for State water quality standards.

Road construction will be done in accordance with Best Management Practices listed in 33 CFR 323.4 (a) (6). No permits are needed under Section 404 of the Clean Water Act since all associated road construction is proposed for silviculture purposes only.

Coastal Zone Management Act of 1976

All alternatives are in compliance with the Coastal Zone Management Act. This Act requires federal agencies to ensure that activities or developments are consistent with approved State coastal management programs to the maximum extent practicable. The Alaska Coastal Management Act of 1977 contains the standard and criteria for the determination of consistency for activities within the coastal zone. The Wrangell District Ranger has determined that this project is consistent to the maximum extent practicable with these standards. The ADGC will respond to this determination after reviewing this EA.

The following regulatory standards apply to this finding:

- * Alaska Statute Title 46, Water, Air, Energy, and Environmental Conservation;
- * Alaska Forest Practices Act of 1990; and
- * District Coastal Management Program.

Alaska Department of Environmental Conservation

The Forest Service and the Alaska Department of Environmental Conservation (ADEC) participate in cooperative water quality management through a Memorandum of Agreement. This EA describes implementation and monitoring of Best Management Practices (BMPs) to comply with both the MOA and the Clean Water Act.

Federal and State Permits, Licenses, and Certifications

To proceed with timber harvest as addressed in this EA, various permits must be obtained from federal and state agencies. The following permits [will be/have been] obtained.

U.S. Army Corps of Engineers

Approvals of discharge of dredged or fill material into waters of the United States (Section 404 of the Clean Water Act of 1977, as amended).

Approval of construction of structures or work in navigable waters of the United States (Section 10 of the Rivers and Harbors Act of 1899).

U.S. Environmental Protection Agency

Storm water discharge permit.

National Pollutant Discharge Elimination System review (Section 402 of the Clean Water Act).

State of Alaska, Department of Natural Resources

Authorization for occupancy and use of tidelands and submerged lands.

State of Alaska, Department of Environmental Conservation

Certification of compliance with Alaska Water Quality Standards (Section 401 Certification).

Solid Waste Disposal Permit (Section 402 of the Clean Water Act).

U.S. Coast Guard

Coast Guard Bridge Permit (in accordance with the General Bridge Act of 1946) required for all structures constructed across navigable waters (within the tidal influence zone) of the United States.

Applicable Laws and Executive Orders

Shown below is a partial list of federal laws and executive orders pertaining to project-specific planning and environmental analysis on federal lands. While most pertain to all federal lands, some of the laws are specific to Alaska. Disclosures and findings required by these laws and orders are contained in Chapter 2 of this EIS.

Multiple-Use Sustained-Yield Act of 1960

National Historic Preservation Act of 1966 (as amended)

Wild and Scenic Rivers Act of 1968, amended 1986

National Environmental Policy Act (NEPA) of 1969 (as amended)

Clean Air Act of 1970 (as amended)

Alaska Native Claims Settlement Act (ANCSA) of 1971

Marine Mammal Protection Act of 1972

Endangered Species Act (ESA) of 1973 (as amended)

Forest and Rangeland Renewable Resources Planning Act (RPA) of 1974 (as amended)

National Forest Management Act (NFMA) of 1976 (as amended)

Clean Water Act of 1977 (as amended)

American Indian Religious Freedom Act of 1978

Alaska Native Interest Lands Conservation Act (ANILCA) of 1980

Archeological Resource Protection Act of 1980

Cave Resource Protection Act of 1988

Tongass Timber Reform Act (TTRA) of 1990

Magnuson-Stevens Fishery Conservation and Management Act of 1996

Executive Order 11593 (cultural resources)

Executive Order 11988 (floodplains)

Executive Order 11990 (wetlands)

Executive Order 12898 (environmental justice)

Executive Order 12962 (aquatic systems and recreational fisheries)

Planning Record - Additional documentation, including more detailed analyses of project-area resources, may be found in the project planning record located at the Wrangell Ranger District Office in Wrangell, Alaska. Other reference documents such as the Tongass Forest Plan, the Tongass Timber Reform Act, and the Alaska Regional Guide are available at public libraries throughout Southeast Alaska as well as at the [Assistant] Forest Supervisor's Office in Petersburg, Alaska. The Forest Plan is also available on the Internet and CD-ROM.

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Chapter 2:

Alternatives

Introduction

This chapter describes and compares the alternatives considered by the Forest Service for the Doughnut project. It includes a discussion of how alternatives were developed, alternatives considered but not studied in detail, the alternatives that are studied in detail and a comparison of the alternatives by issue. Mitigation and monitoring efforts for the project are also summarized. Chapter 2 is intended to present the alternatives in comparative form, sharply defining the issues and providing a clear basis for choices among options by the decision maker and the public (40 CFR 1502.14). For a better understanding of the effects of the alternatives, readers can consult Chapter 3.

Alternative Formulation Process

The alternatives were developed to address the Purpose and Need for the project; to respond to the Key Issues that were identified during public involvement; to meet Forest Plan Standards and Guidelines and other applicable laws. The following are the Key Issues identified for this project:

1. Scenery
2. Economics
3. Wildlife Habitat
4. Access Management

Alternatives Considered, but Dropped From Further Review

One alternative, which considered a connection of the Pats loop road on National Forest System lands, was eliminated from further study because the road was not needed to further access National Forest timber, and its construction, due to location considerations would not be on National Forest land.

Alternatives were originally designed to include additional road construction and harvest units within the Hermit Creek watershed. This road and most of the units were dropped to mitigate potential cumulative watershed effects and other concerns.

Items Common to all Alternatives

All alternatives are consistent with the Tongass Forest Plan. All applicable forest-wide Standards and Guidelines, and Best Management Practices have been incorporated. The Forest Service uses many mitigation and preventive measures in the planning and implementation of land management activities. The application of these measures begins during the planning and design phases of a project. Additional direction comes from applicable Forest Service manuals and handbooks. Riparian management areas have been identified for Class I, II and III streams. An area of 100 acres is maintained for protection of a confirmed Northern Goshawk nest. No commercial timber harvest or road construction is proposed within the goshawk nest buffer. Action alternatives 2, 3, 4, 5, and 6 meet or exceed minimum Forest Plan Standards and Guidelines for wildlife habitat protection. All road construction and use would occur under a cooperative construction-and-use agreement between the Alaska Department of Natural Resources and the Forest Service. None of the alternatives consider new road construction or large-scale timber harvest within the Hermit Creek watershed, though limited harvest is proposed in some alternatives.

Modification of Old-Growth Habitat Reserve

Based on the findings contained in this analysis the Interdisciplinary Team recommends the Forest Plan be amended to allow for an adjustment of the Pats Creek Old-Growth Habitat Reserve. As it is currently delineated, the Pats Creek Old-Growth Habitat Reserve does not meet the Forest Plan criteria found in Appendix K of the forest plan. The Forest Service consulted with the U.S Fish and Wildlife Service and Alaska Department of Fish and Game on possible changes for the reserve. Deficient in total size and a few acres shy in productive old growth acres, the Pats Creek Old-Growth Habitat Reserve is proposed in this

2 Alternatives

analysis to include the area east of the existing reserve to the power line and north to the north end of section 14 (see Chapter 3).

This change to the Pats Creek Old-Growth Habitat Reserve will not have any impact on proposed units in any of the action alternatives. Modification to the Pats Creek Old-Growth Habitat Reserve is expected to result in a non-significant amendment to the Forest Plan (Forest Plan 5-3). This will be addressed in the Decision Notice.

Alternative Descriptions

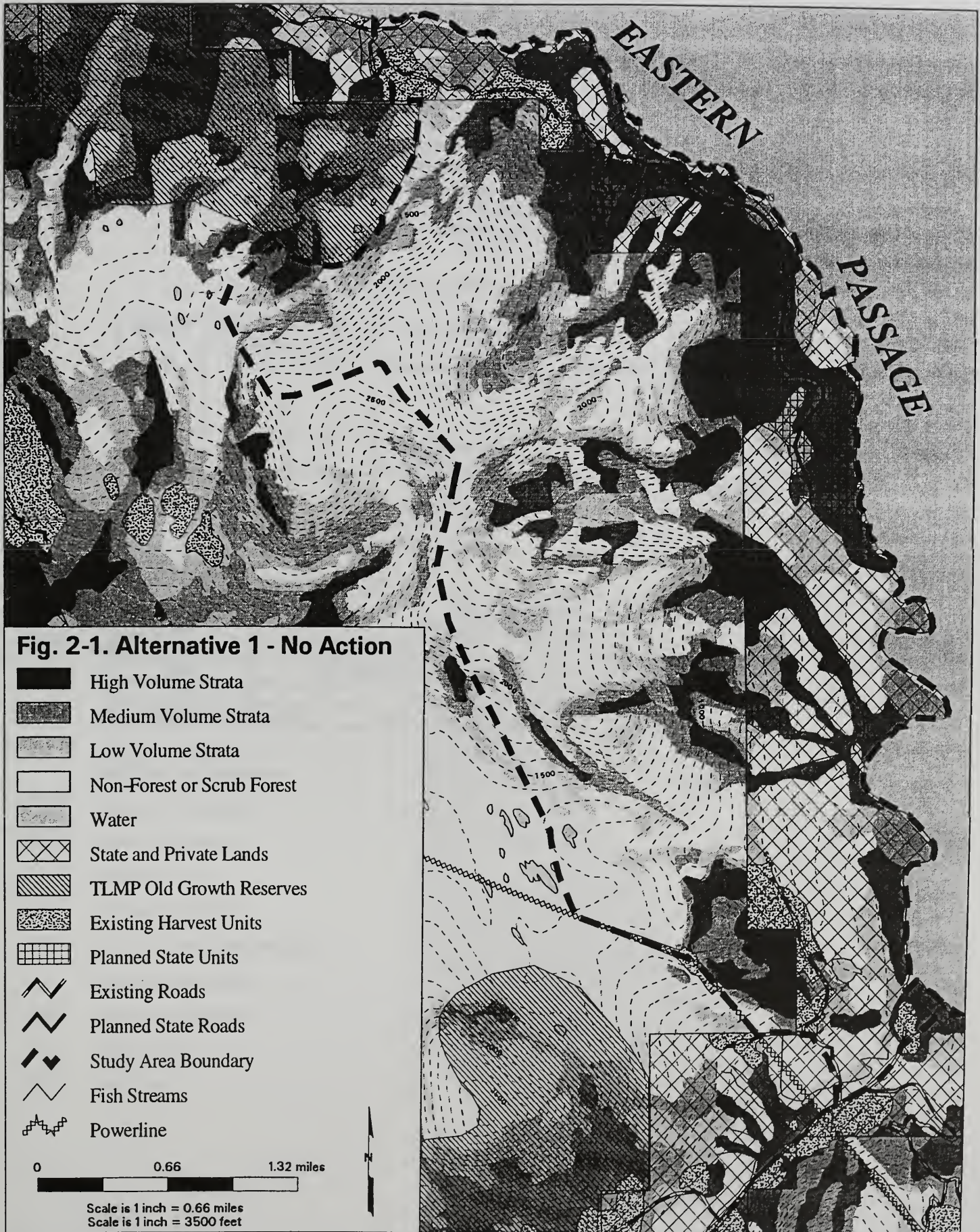
Alternative 1 - No Action Alternative

The emphasis of this alternative is to propose no new timber harvest or road construction for the Doughnut Project Area at this time. It does not preclude timber harvest from other areas at this time, or from the Doughnut Project Area at some time in the future. The Council on Environmental Quality (CEQ) regulations (40 CFR 1502.14d) requires that a "no action" alternative be analyzed in every EA. Alternative 1 also responds to Issues 1 Scenery, and 3 Wildlife Habitat. This alternative represents the baseline existing condition against which the other alternatives are compared. It assumes no change in the current management and would propose no further development. This alternative would allow natural forest structure altering processes to continue without human influence. On National Forest System lands, existing wildlife habitat, watershed, soil productivity, scenic quality and subsistence resources would exhibit those characteristics found in an unmanaged forest. However, these resources could be affected by cumulative impacts because of activities occurring on non-National Forest System lands. There would be no timber supplied to the local and regional industry.

Table 2 - 1 Alternative 1: Unit Summary

Units	Harvest System	Harvest Method	Acres	Harvest Volume	Retention
4, 6, 9, 10, 16, 17, 18, 19, 23, 24, PC1 & PC2	None	Defer harvest for this entry.	464	0	100 %

Total Unit Acres	464
Total Volume (MMBF)	0
Available Project Area Acres Proposed for Harvest.	0 %
Percent of Unit Pool Volume Proposed for Harvest	0 %
Miles of Road Constructed	None
Average Yarding Distance (Helicopter)	0 ft



2 Alternatives

Alternative 2

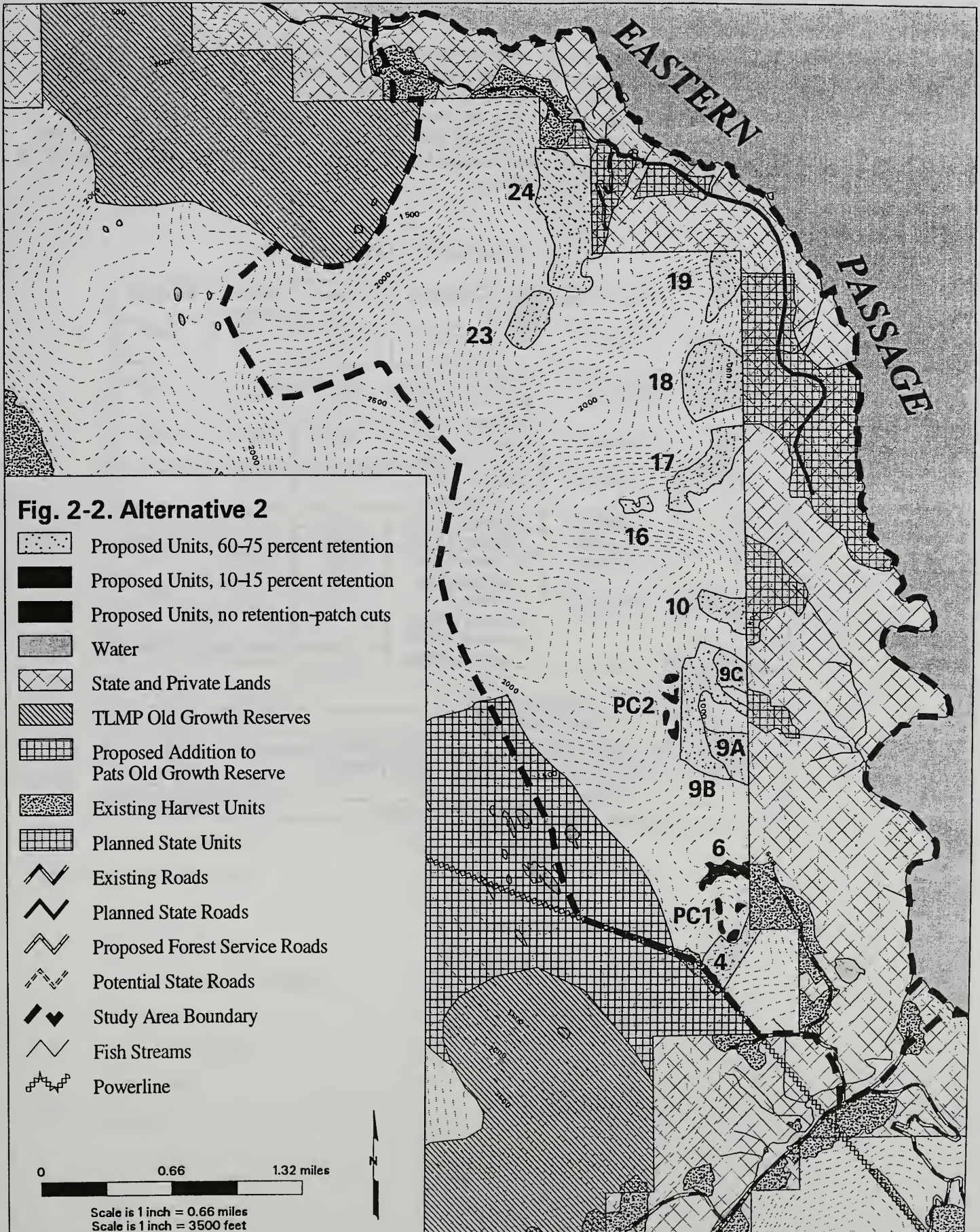
The emphasis of this alternative is to maintain a high degree of the viewshed's existing natural appearance. Harvest under this alternative does not exceed 25% removal of stems within the viewshed of the project area.

The units will be harvested using uneven-age, two-age, and even-age silvicultural systems. Harvest prescriptions include individual tree and group selection in order to retain 75% of the trees (larger than 9 inches in diameter) per acre for proposed units visible from the Eastern Passage. Group Selection and Individual Tree harvest is proposed for 464 acres. Alternative 2 proposes harvest of approximately 4.0 MMBF from 464 acres. No roads would be developed under this alternative. All units would be yarded, by helicopter, to existing roads and landings located on DNR lands.

Table 2 - 2 Alternative 2: Unit Summary

Units	Harvest System	Harvest Method	Acres	Harvest Volume	Retention
4, 6, 9A, 9B, 9C, 10, 17, 18, 19, 23 & 24	Helicopter	Individual tree and Group selection	408	3,562	75%
16	Helicopter	Individual tree and Group selection	6	83	40%
PC1 & PC2	Helicopter	Patch Cut (1-3 acre patches, retaining 70% of existing stand)	50	317	75%

Total Unit Acres	464
Total Volume (MMBF)	4.0
Available Project Area Acres Proposed for Harvest.	8%
Percent of Unit Pool Volume Proposed for Harvest	35%
Miles of Road Constructed	0
Average Yarding Distance (Helicopter)	3,281 ft



2 Alternatives

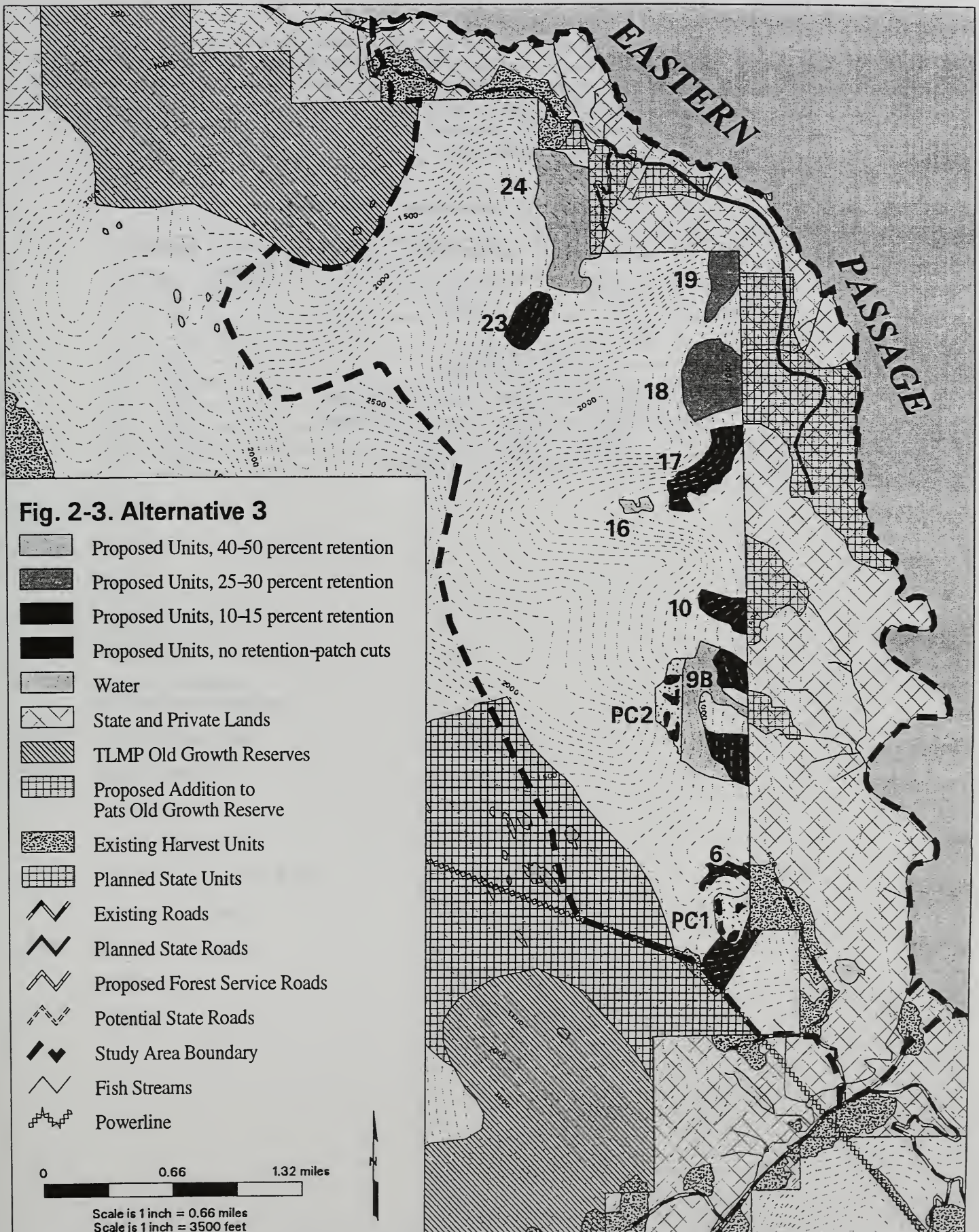
Alternative 3

This alternative meets visual standards while harvesting a greater volume from the project area than Alternative 2. Alternative 3 proposes even-age management on 122 acres. The remaining 342 unit acres will be harvested by using uneven-age and two-age silvicultural systems. Alternative 3 harvests approximately 8 MMBF. Like Alternative 2, this alternative does not propose any road construction. All units are yarded by helicopter to existing facilities located on DNR land. Units 4, 6, 9A, 9B, 9C, 10, PC1 and PC2 would be offered under a separate contract from units 16, 17, 18, 19, 23 and 24. Units 16, 17, 18, 19, 23 and 24 would be offered at a later date.

Table 2 - 3 Alternative 3: Unit Summary

Units	Harvest System	Harvest Method	Acres	Harvest Volume	Retention
6, 9A, 9C & 17,	Helicopter	Clearcut with Reserves	95	2,259	10%
4 & 10	Helicopter	Diameter Limits	46	949	15%
16	Helicopter	Individual tree and Group selection	6	83	40%
9B	Helicopter	Diameter Limits w/ Exclusions	61	924	50%
18	Helicopter	Diameter Limits w/ Exclusions	61	1,220	30%
19	Helicopter	Diameter Limits	25	404	25%
23	Helicopter	Diameter Limits	27	486	10%
24	Helicopter	Diameter Limits w/ Exclusions	93	1,404	50%
PC1 & PC2	Helicopter	Patch Cut (1-3 acre patches, retaining 70% of existing stand)	50	317	70%

Total Unit Acres	464
Total Volume (MMBF)	8.0
Available Project Area Acres Proposed for Harvest.	25%
Percent of Unit Pool Volume Proposed for Harvest	72%
Miles of Road Constructed	0
Average Yarding Distance (Helicopter)	3,237 ft



2 Alternatives

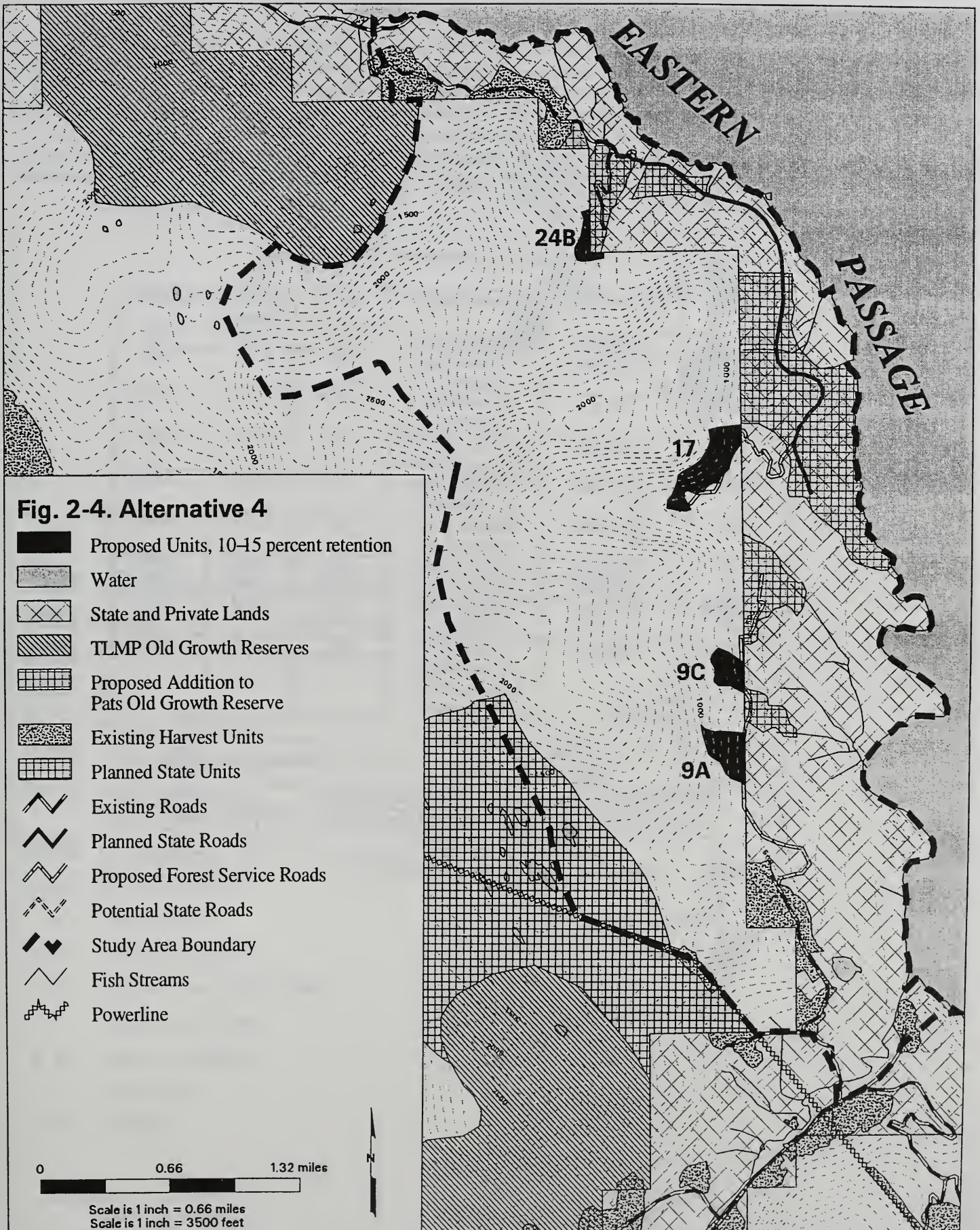
Alternative 4

Alternative 4 proposes harvest of approximately 2.2 MMBF from 91 unit acres using even-age management. This alternative meets visual standards while harvesting only that volume accessible from the proposed road. Alternative 4 avoids harvesting those units where a helicopter would be required for yarding. Units 9A, 9C, 17 and 24B would be clearcut with reserves to maximize timber harvest while meeting partial retention guidelines. This alternative builds 1.4 miles of specified road north from an existing state road and 1.2 miles of temporary road.

Table 2 - 4 Alternative 4: Unit Summary

Units	Harvest System	Harvest Method	Acres	Harvest Volume	Retention
9A, 9C, 17 & 24B	Cable	Clearcut w/ reserves	91	2,158	10%

Total Unit Acres	91
Total Volume (MMBF)	2.2
Available Project Area Acres Proposed for Harvest.	6%
Percent of Unit Pool Volume Proposed for Harvest	19%
Miles of Road Constructed	2.6
Average Yarding Distance (Helicopter)	0



2 Alternatives

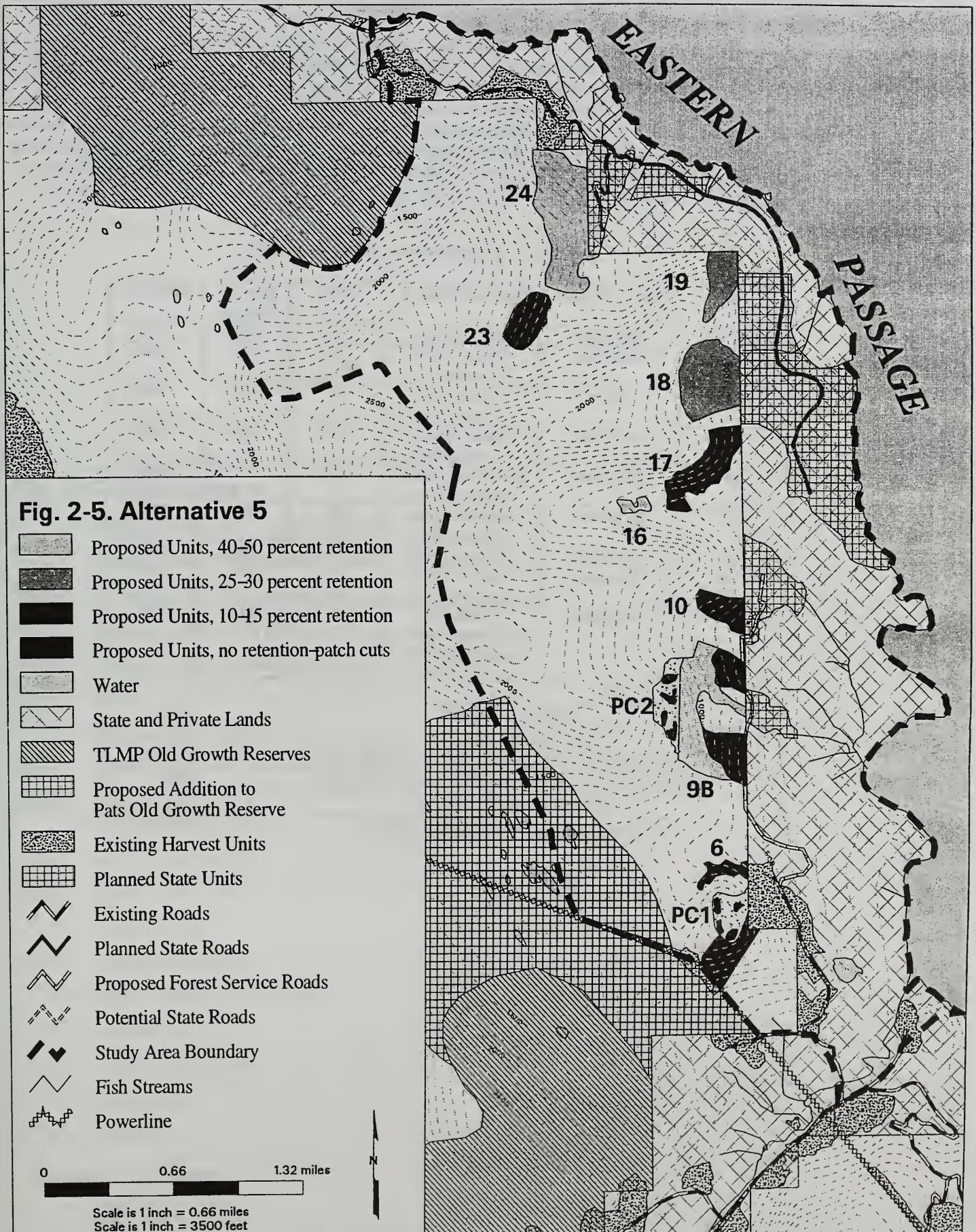
Alternative 5 - Proposed Action

Alternative 5 proposes the same harvest level as Alternative 3. Alternative 5 differs from Alternative 3 in that approximately 0.9 MMBF would be harvested by cable from the proposed road. This alternative builds 1.4 miles of specified road. This road extends an existing state road north accessing cable unit 9A and 9C. Alternative 5 proposes clearcutting with reserves on 95 acres. Units 4, 6, 9A, 9B, 9C, 10, PC1 and PC2 would be offered under a separate contract from units 16, 17, 18, 19, 23 and 24. Units 16, 17, 18, 19, 23 and 24 would be offered at a later date. Units 6, 9A, 9C and 23 would be managed as even age stands, while units 4, 9B 10, 16, 17, 18, 19, 24, PC1, and PC2 would be managed as two-age or uneven-age stands.

Table 2 - 5 Alternative 5: Unit Summary

Units	Harvest System	Harvest Method	Acres	Harvest Volume	Retention
4 & 10	Helicopter	Diameter Limits	46	949	15%
6 & 17	Helicopter	Clearcut with Reserves	54	1,334	10%
9A & 9C	Cable	Clearcut with Reserves	41	925	10%
16	Helicopter	Individual tree and Group selection	6	83	40%
9B	Helicopter	Diameter Limits w/ Exclusions	61	924	50%
18	Helicopter	Diameter Limits w/ Exclusions	61	1,220	30%
19	Helicopter	Diameter Limits	25	404	25%
23	Helicopter	Diameter Limits	27	486	10%
24	Helicopter	Diameter Limits w/ Exclusions	93	1,404	50%
PC1 & PC2	Helicopter	Patch Cut (1-3 acre patches, retaining 70% of existing stand)	50	317	70%

Total Unit Acres	464
Total Volume (MMBF)	8.0
Available Project Area Acres Proposed for Harvest.	72%
Percent of Unit Pool Volume Proposed for Harvest	25%
Miles of Road Constructed	1.4
Average Yarding Distance (Helicopter)	2,422 ft



2 Alternatives

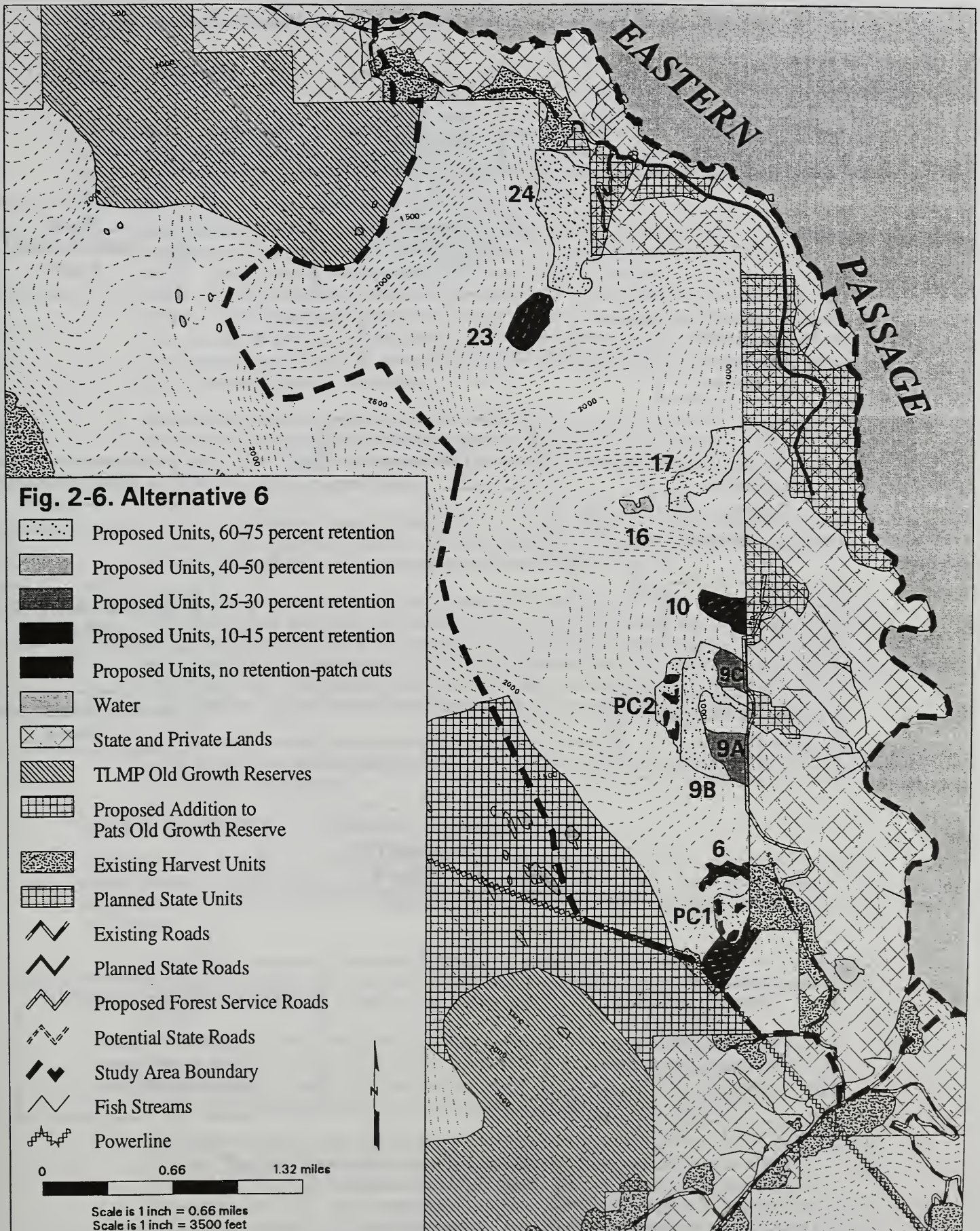
Alternative 6

This alternative mirrors alternative 5 while meeting visual and wildlife standards at a higher level. Differences with alternative 6 from alternative 5 include no harvest of units 18 and 19 during this entry. Alternative 6 proposes higher retentions in units 9A, 9B, 9C, 17 and 24. Alternative 6 harvests approximately 4.9 MMBF. This alternative manages approximately 78 acres using even age silvicultural systems. Approximately 190 acres would be managed using uneven-age or two-aged silvicultural systems. Like alternative 5 alternative 6 builds 1.4 miles of specified road. This road extends an existing state road north accessing cable unit 9A and 9C. Units 4, 6, 9A, 9B, 9C, 10, PC1 and PC2 would be offered under a separate contract from units 16, 17, 23 and 24. Units 16, 17, 23 and 24 would be offered at a later date.

Table 2 - 6 Alternative 6: Unit Summary

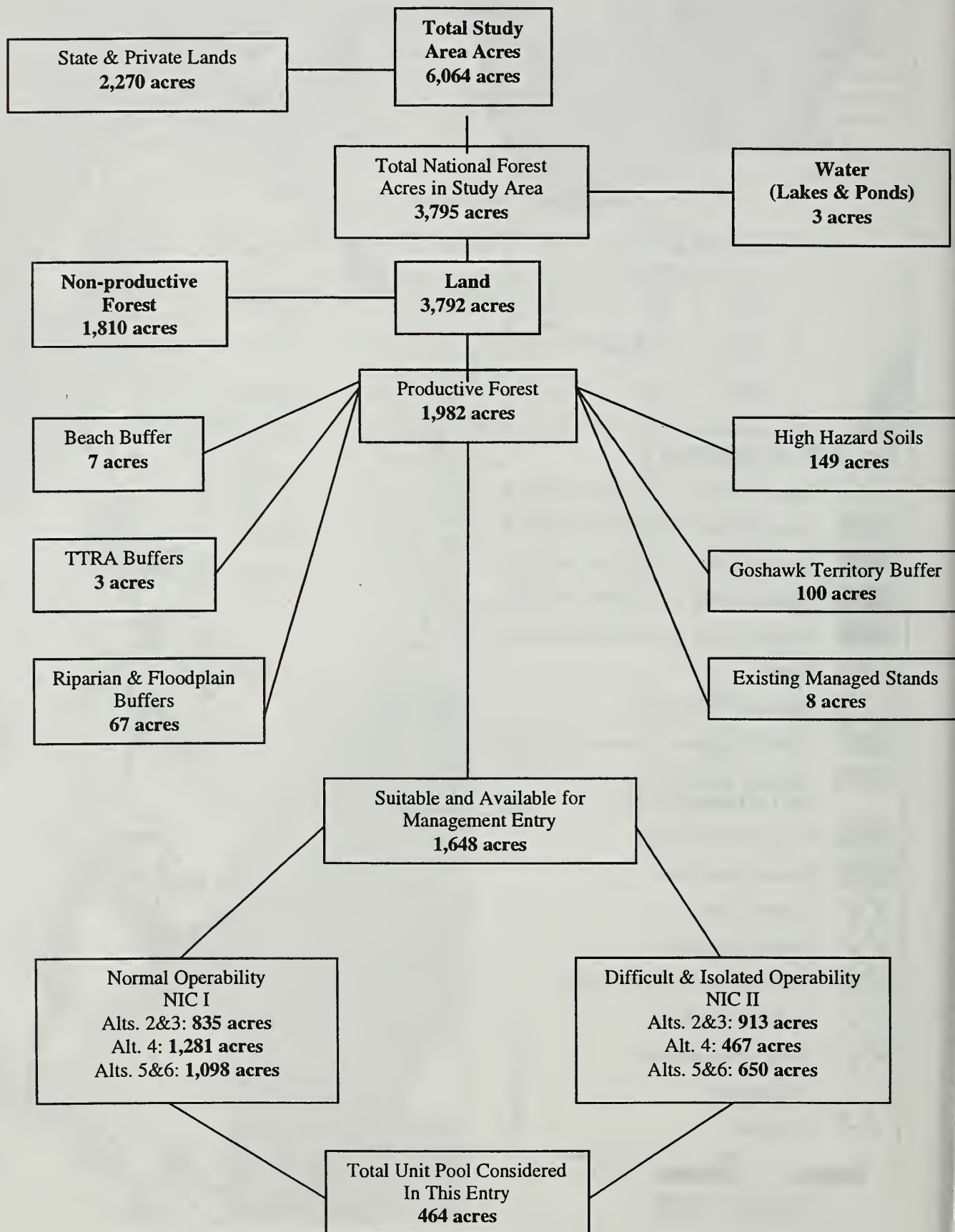
Units	Harvest System	Harvest Method	Acres	Harvest Volume	Retention
4 & 10	Helicopter	Diameter Limits	46	949	15%
6	Helicopter	Clearcut with Reserves	10	225	10%
9A & 9C	Cable	Clearcut with Reserves	41	873	25%
9B	Helicopter	Diameter Limits w/ Exclusions	61	665	75%
16	Helicopter	Individual tree and Group selection	6	83	40%
17	Helicopter	Diameter Limits w/ Exclusions	44	486	75%
23	Helicopter	Diameter Limits	27	486	10%
24	Helicopter	Diameter Limits w/ Exclusions	93	814	75%
PC1 & PC2	Helicopter	Patch Cut (1-3 acre patches, retaining 70% of existing stand)	50	317	70%

Total Unit Acres	378
Total Volume MMBF	4.9
Available Project Area Acres Proposed for Harvest.	17%
Percent of Unit Pool Volume Proposed for Harvest	44%
Miles of Road Constructed	1.4
Average Yarding Distance (Helicopter)	2,205 ft



2 Alternatives

Table 2 -7 Doughnut Existing Condition (Land Management Classification)



Alternative Responsiveness to Issues

Issue 1-Scenery

All alternatives would meet the Visual Quality Objective of Partial Retention. Alternatives 3, 4, and 5 propose clearcuts with reserves to retain at least 10-15% of the stand's estimated trees per acre and do not exceed 44 acres in size. Alternative 6 proposes clearcuts with reserves to retain at least 10-25% of the stand's estimated trees per acre and do not exceed 40 acres in size.

- Alternative 1 maintains the existing scenic condition; no harvest would occur. Alternative 1 defers management in the area until a future date. This will have the effect of reducing the amount of time over a rotation in which to spread harvest, which would tend to compress schedules in the future on visible hillsides in the Scenic Viewshed LUD. Deferring harvest at this time may require future managers to extend rotation ages in this area beyond those modeled in the Forest Plan in order to meet the required Visual Quality Objectives. Alternative 2 proposes a relatively low intensity harvest over the seen area. Unit harvest does not exceed 25% removal. All yarding will be accomplished by helicopter.
- Alternative 3 proposes even-aged harvest units with reserves for 142 acres, which is designed to be subordinate to the existing landscape; retain at least 10-15% of the stand's estimated trees per acre; and do not exceed 44 acres in size. The remaining units retain from 25%-70%. All yarding will be accomplished by helicopter.
- Alternative 4 proposes design of units' 9A, 9C, 17, and 24B to be subordinate to the existing landscape. The proposed clearcuts will retain 10% of the estimated trees per acre, and do not exceed 44 acres in size. All proposed harvest would be cable yarded.
- Alternative 5 proposes even-aged harvest units with reserves on 142 acres, which are designed to be subordinate to the existing landscape retain at least 10-15% of the stand's estimated trees per acre; and do not exceed 44 acres in size. The remaining units retain from 25% to 70%. The effects to scenery in Alternative 5 are essentially the same as in Alternative 3, except Alternative 5 proposes a road, which would result in 41 acres being harvested by cable (Units 9A, and 9C). Cable harvest tends to be more noticeable than similar harvest yarded by helicopter.
- Alternative 6 proposes even-aged harvest units with reserves on 124 acres that are designed to be subordinate to the existing landscape; retain 10-25% of the stand's estimated trees per acre, and do not exceed 27 acres in size.

Issue 2- Economics

Alternatives 2, 3, 4, 5, and 6 provide for some net economic return. Alternative 1 provides no economic return this entry. Alternatives 2, 3, 4, 5, and 6 would contribute to the yearly timber volume for the Tongass National Forest as planned. Alternative 1 does provide available volume for future entries over the rotation.

- Alternative 1 defers any harvest at this time. No timber would be available for use by the timber industry in this entry. In order to provide a continuous supply of forest products, other locations would have to be found on the Tongass at this time.
- Alternative 2 would provide for a sale large enough to warrant the use of a helicopter. The average yarding distance for helicopter is estimated to be 3,281 feet. The use of group and individual tree selection would increase sale preparation costs. The long-term timber volume production would be achieved by more frequent, light entries over a large area.
- Alternative 3 results in the highest monetary return of all the alternatives. This alternative results in a "Net Stumpage Value" of \$12 per thousand board foot increase from alternative 2, a \$10 per thousand board foot increase from alternative 4, a \$2 per thousand board foot increase from alternative 5 and a \$18 per thousand board foot increase from alternative 6. The average yarding distance for helicopter is estimated to be 3,237 feet. Under this alternative, units may be offered for sale under smaller separate contracts in different years. Future entries could consist of small roadside and small to medium size helicopter sales.

2 Alternatives

- Alternative 4 relies entirely on volume available from the proposed road. Alternative 4 proposes 1.4 miles of specified road and 1.2 miles of temporary road. This alternative shows the lowest net return under the low market scenario due to a difference in species composition. In alternative 4 spruce volume comprises 20 percent of the volume proposed for harvest whereas spruce is only 15 percent in alternatives 2, 3, 5, and 6. Under the low market scenario spruce selling values are \$267 dollars less than the high market spruce selling values. Because alternative 4 harvests a greater percentage of spruce, low market stumpage values are lower than the other alternatives.
- Alternative 5 would provide for a sale large enough to warrant the use of a helicopter. Road construction in alternative 5 allows for shorter yarding distances and future entries to be more economical. The average yarding distance for helicopter is estimated to be 2,422 feet. Under this alternative, units may be offered for sale under smaller separate contracts in different years. Future entries could consist of small roadside and small to medium size helicopter sales.
- Alternative 6 would provide for a sale of enough value to warrant the use of a helicopter. Alternative 6 results in lowest monetary return of the action alternatives. This is due to the value of the estimated volume harvested relative to the cost of the proposed road and associated helicopter yarding costs. The average yarding distance for helicopter is estimated to be 2,205 feet. The cost of building 1.4 miles of specified road in alternative 6 reduces the net stumpage values by \$49 per thousand board feet compared to \$30 per thousand in alternative 5. This \$19 per thousand board feet difference is a result of harvesting approximately 3,148 thousand-board feet less in alternative 6 than alternative 5. Under this alternative, units may be offered for sale under smaller separate contracts in different years. Remaining volume not harvested in this entry would contribute to one or more future entries over the rotation. Future entries could consist of small roadside and small to medium size helicopter sales. Harvest sustainability would improve with volume being deferred for later entries

Issue 3- Wildlife Habitat

The Pat Creek Old-Growth Habitat Reserve is modified to meet the Forest Plan Appendix K criteria under all action alternatives. The North Wrangell Old-Growth Habitat Reserve is sufficient in size and productive old growth. We do not propose any changes to the North Wrangell reserve with any alternative.

- Alternative 1 proposes no changes to existing wildlife habitat conditions.
- Alternative 2 proposes all helicopter harvest and no new road building. Helicopter units would retain 75% of the existing stems leaving a high amount of forest structure as compared to a traditional clear-cut harvest. More forest structure will most likely benefit some old-growth species such as the Northern Goshawk and Northern Flying Squirrel as well as maintaining forested corridors. More forest structure may intercept snow thus leaving winter forage available for deer. Alternatives 2 and 3 do not build any new roads and will benefit species sensitive to human disturbance associated with roads such as wolves and marten. This action alternative ranked the highest for wildlife based on road density and forest corridor effects. We also ranked this action alternative as the most responsive to deer habitat concerns.
- Alternative 3 also responds to wildlife concerns with regards to road development by not developing new roads. Alternative 3 and 5 harvest more old-growth acres than other alternatives but propose lighter harvest for PC1, PC2 and Unit 24 to maintain some forested corridors. Of the action alternatives, alternative 3 and alternative 2 have the lowest road density. Alternative 3 and 5 are the least responsive to forest corridor and deer habitat concerns.
- Alternative 4 harvests less old-growth acres than other alternatives with this entry but develops 2.6 miles of road – more road than any other alternative. This alternative does not propose any harvest units adjacent to the 100-acre goshawk nest buffer. Less forest structure is retained within harvest units with this alternative but units are small and dispersed. Action alternatives 4 and 2 are the most responsive to forest corridor concerns. This action alternative is responsive to deer habitat concerns by having less of an affect upon habitat. Alternatives 4, 5, and 6 rank lowest for wildlife based on our road density measure.
- Alternative 5 harvests more old-growth acres than other alternatives overall but proposes lighter harvest for PC1, PC2 and Unit 24 to maintain some forested corridors. This alternative builds 1.4

miles of road. Along with alternative 3, this action alternative is the least responsive to wildlife concerns based on our measures.

- Alternative 6 also builds 1.4 miles of road, which is less responsive to wildlife species sensitive to roads than alternatives 2 and 3. Alternative 6 harvests more old-growth acres than Alternatives 2 and 4 but retains more forest structure than Alternatives 3 and 5. Lighter harvest is proposed adjacent to State land in several units, which will enhance corridor values. Alternative 6 is more responsive to forest corridor and deer habitat concerns than alternatives 3 or 5 but less so than alternatives 2 and 4.

Issue 4- Access Management

- Alternative 1 proposes no change to the existing access and road system.
- Alternatives 2 and 3 propose no new road construction. These alternatives propose to use a helicopter to yard all units to existing road locations on DNR lands. There is no expected change to access on National Forest lands.
- Alternative 4 proposes constructing 1.4 miles of permanent road and 1.2 miles of temporary road. Most of the permanent road construction would be on DNR land. The permanent road would remain open after completion of timber harvest. Approximately 0.5 miles of the temporary road would be constructed on National Forest and the remaining portion would be constructed on DNR land. The temporary road on National Forest would be closed and drainage structures removed prior to sale termination.
- Alternatives 5 and 6 each propose to construct 1.4 miles of permanent road. Most of the permanent road construction would be on DNR land. The permanent road would remain open after completion of timber harvest.

Table 2 - 8 Comparison of Alternatives by Issue

Comparison Element	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6
KEY ISSUE 1: Scenery						
Average Retention as Seen from the Eastern Passage Viewpoint	100%	75%	32%	10%	32%	52%
Average Retention as Seen from the Mill Creek Viewpoint.	100%	75%	35%	10%	35%	57%
Overall Average Retention of Seen Acres	100%	75%	34%	10%	34%	55%
KEY ISSUE 2: Economics and Long-term Sustainability						
Timber Volume Offered (mmbf)	0	3.962	8.046	2.158	8.046	4.898
Cable Harvest (acres)	0	0	0	91	41	37
Helicopter Harvest (acres)	0	116	406	0	365	251
Cable Harvest Volume (mmbf)	0	0	0	2.158	0.925	0.873
Helicopter Harvest Volume (mmbf)	0	3.962	8.046	0	7.121	4.025
Road Constructed (mi)	0	0	0	2.6	1.4	1.4
Estimated Net Stumpage Value (\$/mbf)						
"High Market" scenario		66	78	68	76	60
"Low Market" scenario		-120	-108	-140	-110	-125
NIC I (acres)	616	730	730	1,178	993	993
NIC I Harvest (acres)	0	91	315	91	377	259
NIC II (acres)	1132	898	898	450	633	633
NIC II Harvest (acres)	0	32	91	0	29	29

2 Alternatives

Table 2 - 8 Comparison of Alternatives by Issue (cont'd)

Comparison Element	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6
KEY ISSUE 3: Wildlife Habitat						
Impact to forest travel corridors (measured by % of unit pool volume proposed for harvest. Less harvest = more structure and less impact)	0%	35%	72%	19%	72%	44%
% of High Quality Marten Habitat remaining	100%	83%	83%	96%	83%	87%
Open Road Density for project area (mi/mi ²).	.72	.72	.72	1.04	.92	.92
% of High Quality Deer Winter Range Remaining	100%	100%	100%	100%	100%	100%
% of Medium Quality Deer Winter Range Remaining	100%	95%	94%	96%	94%	94%
KEY ISSUE 4: Access Management						
Miles of road open to motorized use	0	0	0	2.6	1.4	1.4
Contribute to a Pat Creek Loop	No	No	No	Yes	Yes	Yes
Soils						
Total Disturbance	0 ac.	0 ac.	0 ac.	6.67 ac.	0.41 ac.	0.37 ac.
Fisheries, Watershed, and Marine Habitats						
Number of fish-bearing watersheds exceeding cumulative harvest threshold of 20% (less than 70% retention)	1	1	3	1	3	2
Cumulative harvest in the above watersheds	38%	38%	36%, 34%, 57%	39%	36%, 34%, 57%	22%, 38%
Roadless Area #227						
Total Roadless Acres (updated 2000)	7,597 ac.	7,357 ac.	6,656 ac.	7,244 ac.	6,635 ac.	6,945 ac.

Mitigation Measures

The analysis documented in this EA discloses the possible adverse impacts that may occur as the result of implementing the actions proposed. Therefore, measures were formulated to mitigate these impacts. These measures were guided by the Forest Plan Goals and Objectives for the applicable LUDs and follow the Forest-wide Standards and Guidelines (USDA Forest Service, 1997b). The mitigation measures are grouped into two categories. General mitigation measures apply to the entire project, while site-specific mitigation measures are identified for specific units or roads.

A wide variety of site-specific mitigation measures, designed primarily to avoid or minimize adverse impacts, have been evaluated and those that are most appropriate have been incorporated into harvest unit and road design. These site-specific measures are summarized in Appendix E and are referenced in the unit and road cards (Appendices A and B).

In addition to the site-specific mitigation measures listed in Appendix E and the unit and road cards, a variety of mitigation measures would apply to all harvest and construction activities and would be incorporated in timber harvest unit and road design. These include all appropriate BMPs. Direction for use of BMPs on National Forest System Lands in Alaska is included in Chapter 10 of FSH 2509.22, the Region

10 Soil and Water Conservation Handbook (USDA Forest Service, 1996). The handbook describes the application, monitoring, evaluation and refinement of these BMPs. Appendix C of the Forest Plan (USDA Forest Service, 1997b) provides a list and brief summary of the BMPs used in Region 10. Many other Forest Plan Standards and Guidelines apply, in addition to those cited in the list of mitigation measures below. These standards and guidelines, including Appendix C of the Forest Plan, are incorporated by reference (USDA Forest Service, 1997b).

General Mitigation Measures

These general measures may apply to all units and roads in a project area and/or they may apply to other portions of a project area. The source(s) of each general measure are listed after the measure in terms of individual Forest-wide Standards and Guidelines (see Chapter 4 of the Forest Plan) or BMPs (see Appendix C of the Forest Plan and Chapter 10 of FSH 2509.22, The Soil and Water Conservation Handbook).

Air Quality Protection: Design projects to control air pollution impacts and to ensure that the predicted emissions from all pollution sources do not exceed ambient air quality standards, as specified under the Alaska Administration Code, Title 18, Chapter 50; applicable permits will be obtained from ADEC for all projects. (AIR 112).

Soil/Water Protection during Timber Sale Planning: Incorporate soil and water resource considerations into timber sale planning. Include site-specific considerations, identifying wetlands and riparian areas; locating and designing harvest activities to protect these resources; designating water quality protection needs on sale area maps; incorporating erosion control and timing responsibilities into the Operating Schedule; and including non-recurring "C" provisions to protect soil and water resources in timber sale contracts. (BMPs 13.1, 13.2, 13.3, 13.4, 13.17)

Soil/Water Protection during Road Development: Implement measures to reduce surface erosion and drainage interruption related to transportation including water barring and cross-draining roads using ditches and culverts to prevent water running long distances over roads, closure, and seeding and fertilizing cut-and-fill slopes. (BMPs 14.1, 14.2, 14.3, 14.5, 14.7, 14.8, 14.9, 14.10, 14.11, 14.12, and 14.19)

Soil/Water Protection during Road Management: Conduct road maintenance and snow removal operations to minimize disruption of road surfaces, embankments, ditches, and drainage facilities, and use road closures or other measures to keep road surface and road site erosion at low or background levels. (TRAN23-I, BMPs 14.20 and 14.23)

Temporary Road Obliteration: Obliterate temporary roads after use, remove or bypass drainage structures and install waterbars in appropriate places. (RIP2-II and BMPs 12.17 and 14.24)

Soil/Water Protection during Development of Rock Sources: Implement measures to reduce surface erosion and other impacts on soils and water from gravel sources and quarries, LTFs, sort yards, and other facilities. (BMPs 14.18, 14.19, 14.25, 14.26, and 14.27)

Accidental Spills: Implement measures and plans to prevent the contamination of soil and water from accidental spills of petroleum products and hazardous substances. (BMP 12.8 and 12.9)

Heritage Site Discovery: Suspend work if a heritage site is discovered during project implementation. Authorize resumption of work only after consultation with the State Historic Preservation Office is complete.

Maximum Size of Created Openings: Limit created openings to a maximum size of 100 acres. (TIM114-IV)

Maintain Minor Tree Species: Selectively maintain minor species (e.g., yellow-cedar, western red cedar, Pacific yew), where appropriate for the site, as viable components of future stand, for vegetative diversity, and for seed trees. (TIM111-2-I, TIM114-II)

Certification of Reforestation: Certify that every unit that receives a final harvest meets or surpasses the stocking guidelines and certification standards (FSH 2409.17) within 5 years. (TIM24)

Wetland Protection: Minimize the loss of all wetlands, but particularly the higher value wetlands (especially fens), and minimize the adverse impacts of land management activities on wetlands; follow Executive Order 11990 and the BMPs. (WET-I, WET-III, BMP 12.5)

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Non-Development LUD Protection: Avoid timber harvest impacts and minimize road construction within non-development LUDs such as Old-Growth Habitat, Remote and Semi-Remote Recreation, and Wild and Scenic River corridors.

Connectivity Between Old Growth Reserves: Provide corridors of old growth forest between and among medium and large old-growth reserves. Where sufficient connectivity does not exist, or where the minimum Forest Plan criteria are not met, relocate or redesign mapped, small old growth reserves. (WILD112-XVIII)

Road Mitigation Measures Common to Alternatives 4, 5, and 6

Some mitigation measures apply specifically to road construction, and so apply only to Alternatives 2 and 3, which are the only alternatives that propose construction of roads.

Storm-proofing Roads

Long-term roads will be designed with armored dips adjacent to culverts, substantial ditch blocks, drivable waterbars, and other protective measures to minimize the risks of culvert failure or erosion of the road surfaces and ditch lines. These measures will ensure the integrity of the roads in the project area during periods of inactivity.

Road Maintenance and Access Management

The Forest Service and the DNR have in place a Construction and Use Agreement for existing roads and planned roads on Wrangell Island. This agreement includes roads that are mutually beneficial for accessing forested lands for timber management. The Agreement Area consists of adjoining National Forest and DNR forestlands that are accessible by a common road location. Under this agreement we are permitted to jointly use roads on National Forest Lands or DNR lands and share maintenance responsibilities commensurate with use. Existing and planned roads in the Doughnut Project Area and planned project roads constructed by the Forest Service or the DNR are included in the agreement.

After construction, roads may be maintained at one level during project implementation and maintained at a different level after the Project. The operational maintenance level is the level currently assigned to a road considering today's needs, road condition, budget constraints, and environmental concerns; in other words, it defines the level that roads in the Doughnut area would be maintained during the timber sale. The objective maintenance level is the level to be assigned after timber harvest, considering future road management objectives, traffic needs, budget constraints, and environmental concerns.

Maintenance levels vary from the least amount of maintenance (Level 1) to the greatest amount of maintenance (Level 5). Level 1 maintenance is assigned to roads that are closed, with only basic custodial maintenance performed to protect road investments and protect adjacent resources. Level 5 maintenance is assigned to roads requiring a high degree of user comfort and convenience. These roads are normally double lane, paved facilities or may be dust abated aggregate surfaced roads.

The operational and objective maintenance level planned for roads in the Project Area is Level 2: This level is assigned to roads open for limited passage of traffic. Traffic is normally minor, usually consisting of one or a combination of administrative, permitted, dispersed recreation or other specialized uses. Log haul may occur at this level. Roads in this maintenance level are normally characterized as single lane facilities intended for use by high-clearance vehicles. Roads at this level are not subject to the Highway Safety act and passenger car traffic is not a consideration.

The traffic management strategy for roads in the project area is to Accept high-clearance highway vehicles (such as pickup trucks) and to Discourage passenger vehicles after timber harvest.

Instream Activities

Road cards display fish passage requirements and other mitigation measures (Appendix B).

Temporary Road

A spur road, constructed under Alternative 4, would be constructed to facilitate obliteration through natural regeneration on the running surface, either by using wood mulch over crushed rock, or adding mineral soil to wood mulch. All drainage structures would be removed to restore natural drainage patterns, adding waterbars as needed to control runoff, and establishing vegetative cover. Red alder (*Alnus rubra*), an invasive species that naturally colonizes disturbed areas, is the species that would be used.

Monitoring

The National Forest Management Act requires that National Forests monitor and evaluate their forest plans (36 CFR 219.11). Chapter 6 of the Forest Plan includes the monitoring and evaluation activities to be conducted as part of Forest Plan implementation. There are three categories of Forest Plan monitoring:

- **Implementation monitoring.** Used to determine if the goals, objectives, Standards and Guidelines, and practices of the Forest Plan are implemented in accordance with the Forest Plan.
- **Effectiveness monitoring.** Used to determine if the Forest Plan Standards and Guidelines, and practices, as designed and implemented are effective in accomplishing the desired result.
- **Validation monitoring.** Used to determine whether the data, assumptions, and estimated effects used in developing the Forest Plan are correct.

Appendix D of this EA contains the monitoring plan for the Doughnut Timber Sale.

Preferred Alternative

The **Preferred Alternative** designated in this Environmental Assessment is Alternative 6. We feel that Alternative 6 is the best alternative because:

- It addressed the issue of scenery through high retention in visually sensitive areas, thus exceeding scenery LUD objectives.
- It provides the most balance between providing wood products and meeting the needs of the various resources in the project area.
- It addresses comments directed toward the building of a Pats Loop Road as road built would contribute toward, but not complete, the loop road.
- It addresses economics in the long-term as roads constructed for this entry will provide better access for the next entry.
- It addresses wildlife issues of concern by retaining more structure in the stands through retention, is sensitive to development activities on adjacent state and private lands, and retains more cover for the movement of wildlife through the area.
- It is less likely to result in cumulative watershed effects by limiting harvest in small watersheds with existing or planned Alaska DNR harvest.

This EA is not a decision document. The Primary purpose of this EA is to inform the decision maker about our analysis and public comments relative to this project. The decision is made by the Wrangell District Ranger and documented in a Decision Notice. Specific rationale for the decision will be included in the Decision Notice and responses to public comments.

2 Alternatives

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Chapter 3

Environment and Effects

Introduction - This chapter briefly describes the affected environment and the environmental consequences of each alternative by significant issue. It also presents the scientific and analytical basis for the comparison of alternatives presented in Chapter 2.

All effects, including direct, indirect and cumulative effects, are disclosed. Effects are quantified where possible, and qualitative discussions are also included. The means by which potential adverse effects will be reduced or mitigated are described (see also Chapter 2, and Appendices A, B, & E).

The discussions of resources and potential effects take advantage of existing information included in the Tongass Forest Plan Revision FEIS, other project documents, project-specific resource reports and related information, and other sources as indicated. Where applicable, such information is briefly summarized and referenced to minimize duplication. The planning record for the Doughnut project includes all project-specific information, including resource reports, and other results of field investigations. The record also contains information resulting from public involvement efforts. The planning record is located at the Wrangell Ranger District Office in Wrangell, Alaska, and is available for review during regular business hours. Information from the record is available upon request.

Analyzing Effects - Environmental consequences are the effects of implementing an alternative on the physical, biological, social and economic environment. The Council on Environmental Quality (CEQ) regulations implementing the National Environmental Policy Act (NEPA) includes a number of specific categories to use for the analysis of environmental consequences. Several are applicable to the analysis of the proposed project and alternatives, and form the basis of much of the analysis that follows. They are explained briefly here.

Direct, Indirect and Cumulative Effects - Direct environmental effects are those occurring at the same time and place as the initial cause or action. Indirect effects are those that occur later in time or are spatially removed from the activity, but may lead to an effect in the foreseeable future. Cumulative effects result from incremental effects of actions, when added to other past, present, and reasonably foreseeable future actions, regardless of what agency or person undertakes such other actions. Cumulative effects can result from individually minor, but collectively important, actions taking place over a period of time.

Unavoidable Adverse Effects - Implementation of any action alternative would cause some adverse environmental effects that cannot be effectively mitigated or avoided. Unavoidable adverse effects often result from managing the land for one resource at the expense of the use or condition of other resources. Many adverse effects can be reduced, mitigated or avoided by limiting the extent or duration of effects. The interdisciplinary procedure used to identify specific harvest units and roads was designed to eliminate or lessen the adverse consequences. The application of Forest Plan Standards and Guidelines, Best Management Practices, project-specific mitigation measures are all intended to further limit the extent, severity, and duration of potential effects. Monitoring is intended to measure effects and learn from successes or failures. Such measures are discussed throughout this chapter. Regardless of the use of these measures, some adverse effects will occur. The purpose of this chapter is to fully disclose these effects.

Available Information - Much of the Tongass National Forest resource data resides in an electronic database formatted for a geographic information system (GIS). The Forest uses GIS software to assist in the analyses of these data. Resource information used for GIS applications is available in tabular (numerical) format, and as plots displaying data in map format. For this EA, all the maps, and most of the numerical analyses, are based on resource information stored in GIS databases.

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Environment and Effects of the Key Issues

Issue 1 - Scenery.

The Doughnut Project Area is located on the eastern half of North Wrangell Island. The area is visible from Eastern Passage, a travel route along Alaska's Inside Passage, and is viewed mostly by independent boaters, those traveling with outfitter/guides, and residents and property owners of Wrangell Island/East subdivision (State of Alaska). Eastern Passage is occasionally used as a secondary route between Wrangell and Ketchikan by small cruise ships and Alaska Marine Highway ferries. Commercial and sport fishermen frequent the waters near the project area. Land based activities likely to occur include hunting and hiking. In the winter, snowmobilers accessing high country on North Wrangell Island frequently use the southern portion of the project area. The following discussion describes the existing scenic condition of the area, and anticipated effects to the scenery from the alternatives proposed in the Doughnut environmental analysis.

Affected Environment

The elevation of the Doughnut Project Area ranges from sea level to about 2,500 feet. The project area is bounded on the north and east by a strip of State owned forestland. The State has been actively managing their portion of the project area, with a 1.6 mile section of road accessing two harvest units (40 and 45 acres) on the northern border of the project area, and a 1.3 mile section of road accessing one large harvest unit (82 acres) in the southeast corner of the project area. This large harvest unit appears as two units when viewed from the water. The shapes and sizes of the existing State harvest units meet the Modification Visual Quality Objective (VQO), which presents a challenge to the Forest Service. The Forest Plan requires that National Forest System Lands in the Doughnut Project Area be managed to achieve a VQO of Partial Retention (VQO requirements are described below).

Additional developments within the project area boundary include several home sites along the eastern shore, which are visible from the water, and a 6,000-foot section of the Tyee Power line, which serves as a portion of the southern boundary of the project area.

The National Forest System lands within the project area are undeveloped. As seen from the water, the landscape is typified by rolling hills with a uniform vegetative cover. The area includes a variety of landscape forms (valleys, knobs, etc.) which lend to the Visual Absorption Capability (VAC) of the area. Almost all of the acres being considered for harvest in this entry are seen from the water.

The Forest Plan expresses desired future conditions for different areas on the Tongass National Forest in terms of Visual Quality Objectives (VQO's). VQO's are used to describe the existing condition of the landscape (determined by past activities), and define the allowable extent of alteration one might notice when looking across a landscape. There are five VQO's described in the Forest Plan Standards and Guidelines. A brief description of allowable alterations for each VQO follows:

Preservation VQO - Management activities are generally not allowed in this setting. The landscape is allowed to evolve naturally.

Retention VQO - Management activities are not evident to the casual Forest visitor.

Partial Retention VQO - Management activities are subordinate to the characteristic landscape.

Modification VQO - Management activities may visually dominate the characteristic landscape, but must have visual characteristics similar to those of natural occurrences within the surrounding area or character type

Maximum Modification VQO - Management activities may dominate the characteristic landscape, but should appear as a natural occurrence when viewed as background.

Seen areas proposed for harvest are within the Scenic Viewshed Land Use Designation (LUD), as identified by the Forest Plan. The Forest Plan requires that proposed activities within the Scenic Viewshed

LUD must meet the Retention VQO in foreground distance zones, and the Partial Retention VQO in middle and background distance zones; in areas viewed from Visual Priority Routes and Use areas.

Visual Priority Routes and Use Areas are identified in Appendix F of the Forest Plan. Visual Priority Routes and Use Areas with views of the project area include: Eastern Passage (Travel Routes), and Virginia Lake and Creek (Recommended Recreation River).

For planning and analysis purposes, the scenic resource is described in terms of viewpoints. Two viewpoints were identified, each representing a Visual Priority Route and Use Area designated in Appendix F of the Forest Plan. See Figure Scenery-1.

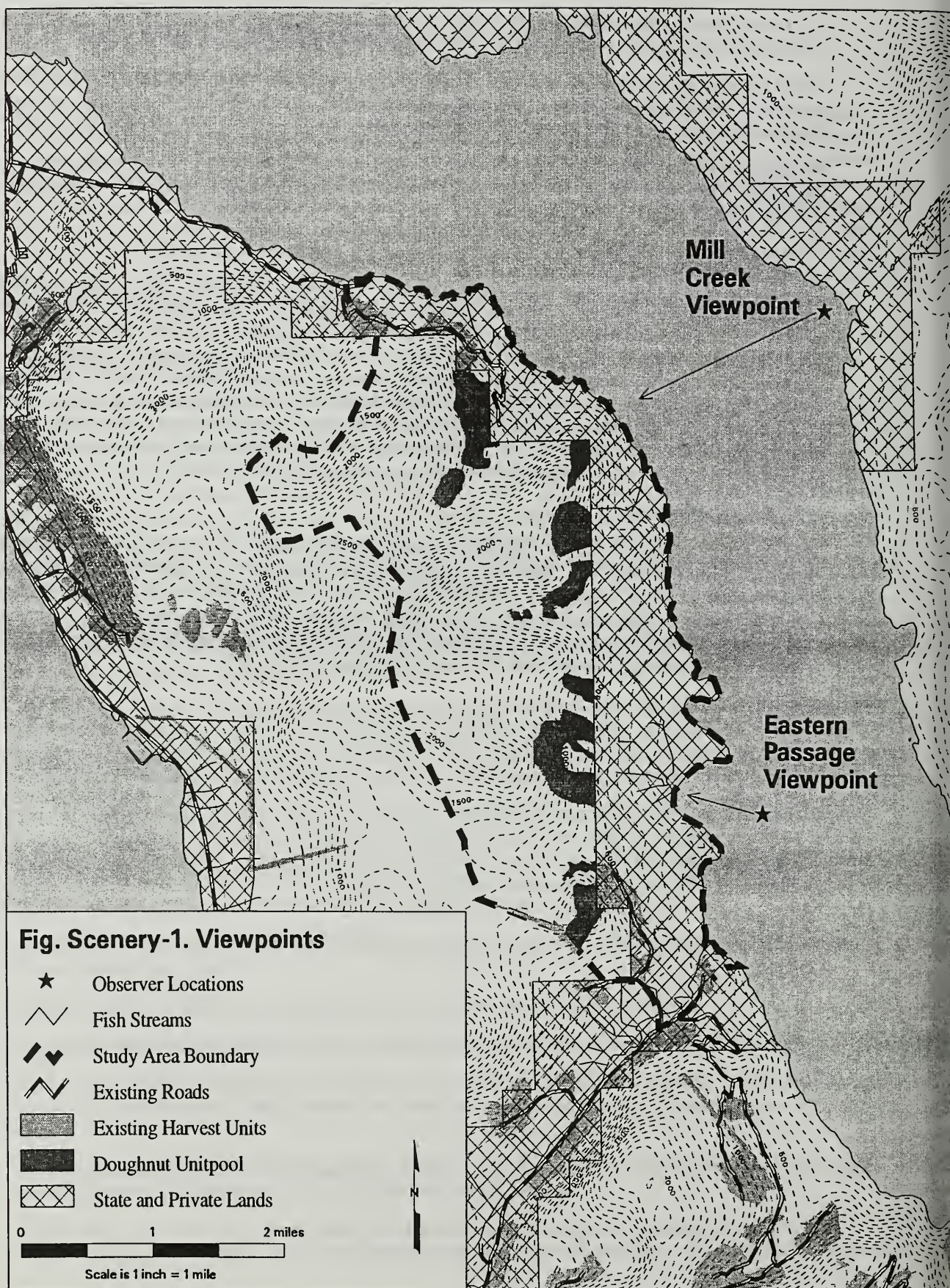
1) Eastern Passage Viewpoint

This viewpoint is located mid-channel along the Eastern Passage travel route, which is often referred to locally as “The Back Channel”. This travel route is used frequently in the summertime by Wrangell resident for recreational boating, fishing, and traveling to such popular destinations as Earl West Cove, Berg Bay, Aaron’s Creek, the Bradfield Canal, and the Anan Wildlife Observatory. Throughout the year, sport and commercial fishermen often use the Back Channel. In the summertime, independent boaters traveling the Inside Passage, small cruise ships, and Alaska Marine Highway ferries sometimes use Eastern Passage as a secondary route between Wrangell and Ketchikan. Eastern Passage is identified as a Visual Priority Travel Route in Appendix F of the Forest Plan. This viewpoint takes in the southern portion of the project area, representing a straight-on view of many proposed harvest units.

2) Mill Creek Viewpoint

This viewpoint is near the mouth of Mill Creek, which is identified as a Recommended Recreation River in Appendix F of the Forest Plan. The river is actually listed as Virginia Creek and Lake, but the name of the river from the mouth of Virginia Lake to saltwater is better known as “Mill Creek”. This area is used by people hiking the Mill Creek Trail, and is a popular destination for fishermen participating in the annual subsistence sockeye fishery during July. Most of the proposed harvest units are visible from this viewpoint, but at a long distance from the viewer, and at an oblique angle.

3 Environment and Effects



Unit Design and Mitigation for Scenery Resources

Throughout the planning for the Doughnut Timber Sale, the scenic condition of the area was considered in the development of draft, subsequent draft, and final alternatives for the EA. As a tool for mitigation, we utilized the Region 10 Landscape Management Handbook system of Visual Management Classes.

In order to determine what kind of harvest activities are compatible in the project area, we split the Doughnut Project Area into Management Classes. First taking the VQO designated in the Forest Plan, then taking into consideration the Visual Absorption Capability (VAC) of the landscape determine the classes. VQO's are expressed in terms of describing the objective for the landscape. VQO's within the Doughnut Project Area included: Retention VQO (in the foreground distance zone of the Scenic Viewshed LUD); Partial Retention (in the middle ground and background distance zones of the Scenic Viewshed LUD); and Maximum Modification (in areas unseen from Visual Priority Routes and Use Areas).

Visual Absorption Capability (VAC) is determined by the general complexity of the landscape, the slope, and the distance from which a person would view an area. VAC is expressed in terms of "High", "Intermediate", and "Low". Low VAC ratings are given to areas where it would be extremely difficult to blend harvest units into the landscape (for example, an area with a steep slope, no shelves, even-age stand, with no rock outcroppings or muskeg meadows to distract the eye from harvest units). High VAC ratings are given to areas with a high degree of variety in the landscape (for example, an area with uneven aged stands, steep v-notches, hidden valleys, open meadows, and natural landslides within the view to distract the eye from introduced harvest units).

The seen area in the Doughnut Project Area is rather consistent in that it has enough topographic variety to utilize unit design to blend the harvest into the landscape, yet it lacks the high level of variety (rock outcroppings, existing landslides, natural openings) that serve to draw the eye away from management activities. For that reason, the entire seen area is rated as "intermediate" VAC.

Environmental Consequences

This section describes how the alternatives compare to each another, when viewed from the two viewpoints described earlier in the Affected Environment section. Each viewpoint discussion begins with a table displaying which harvest units are viewed from that viewpoint in each alternative, a weighted average to determine the average retention of each alternative, and the Visual Quality Objective (VQO) met on Forest System lands as well as the overall VQO met when State lands are included. The table is followed by a discussion section, which describes the visual impacts a viewer would notice from each viewpoint. The discussion section begins with the least noticeable alternatives and ends with the most noticeable of the proposed alternatives. Finally, for each viewpoint, we have included terrain models of each alternative showing how the harvest units would look to viewers.

Eastern Passage Viewpoint

Table Scenery-1: Harvest Units Visible from the Eastern Passage Viewpoint

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6
Units with 10-25% retention	0	0	4, 6, 9A, 9C, 10, 17 (141 Acres)	9A, 9C, 17 (85 acres)	4, 6, 9A, 9C, 10, 17 (141 Acres)	4, 6, 9A, 9C, 10 (97 acres)
Units with 30-50 % retention	0	0	9B, 18 (122 acres)	0	9B, 18 (122 acres)	0
Units with 70-75% retention	0	PC1, PC2, 4, 6, 9ABC, 10, 17, 18 (313 Acres)	PC1, PC2 (50 acres)	0	PC1, PC2 (50 acres)	PC1, PC2, 9B, 17 (155 acres)

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Table Scenery-1 (cont'd): Harvest Units Visible from the Eastern Passage Viewpoint

Total Seen Acres Harvested	0	313	313	85	313	252
Weighted Average of Retention	100%	75%	32%	10%	32%	52%
VQO Met on Forest Acres	R	PR/R	PR	PR	PR	PR
Overall VQO Met	M	M	M	M	M	M

Alternative 1 (see Figure Scenery-2) would result in no change to the existing view. The National Forest System lands would meet the Retention VQO. The overall view would meet the Modification VQO.

Alternative 2 (see Figure Scenery-3) has the least impact of the proposed alternatives. One would not likely notice the units that are seen from this viewpoint, because the 25% removal would result in a textural change with no visible unit boundaries. Alternative 2 would meet the requirements for the Partial Retention VQO, and would likely approach the Retention VQO on National Forest System Lands. The overall view would meet the Modification VQO.

Alternative 4 (see Figure Scenery-5) would result in a noticeable change to the landscape. The three units visible from this viewpoint (units 9A, 9C, and 17) would blend well into the landscape, but would be identifiable as harvest units. Alternative 4 would meet the Partial Retention VQO on National Forest System Lands, and would meet the Modification VQO with the overall view.

Alternative 6 (see Figure 6) would result in a noticeable change to the existing view. With this alternative, there would be 9 harvest units visible from the Eastern Passage Viewpoint. The mix of retention levels would help to blend the harvest units into the landscape and reduce the visual impact. The unit outlines are designed to blend well into the topography of the area. Alternative 6 would meet the Partial Retention VQO on National Forest System lands, and the Modification VQO with the overall view.

Alternatives 3 and 5 (see Figures Scenery-4 and Scenery-6) would be very similar to each other in effects to the scenery resource, and would have slightly higher effects than Alternative 6. With these alternatives, there would be 10 harvest units visible from the Eastern Passage Viewpoint. These alternatives propose all the same harvest units as Alternative 6, with the addition of units 18 and 19. Harvest unit 19 may be visible at a very oblique angle from this viewpoint, but it is unlikely that it would be noticeable to the casual observer because of the 25% retention proposed. Additionally, harvest units 9A, 9B, 9C and 17 would have less retention in these alternatives than the amount proposed in Alternative 6. The number of acres treated and amount of retention are identical for both alternatives, with the only difference being that Alternative 5 would include a road, which would be partially visible from this viewpoint. The road will allow cable yarding in 2 units (9A and 9C). Areas that are cable yarded are generally more noticeable after harvest is complete than areas yarded by helicopter. Both Alternatives 3 and 5 would meet the Partial Retention VQO on National Forest System lands, and the Modification VQO with the overall view.

Figure Scenery-2: Eastern Passage Viewpoint, Alternative 1

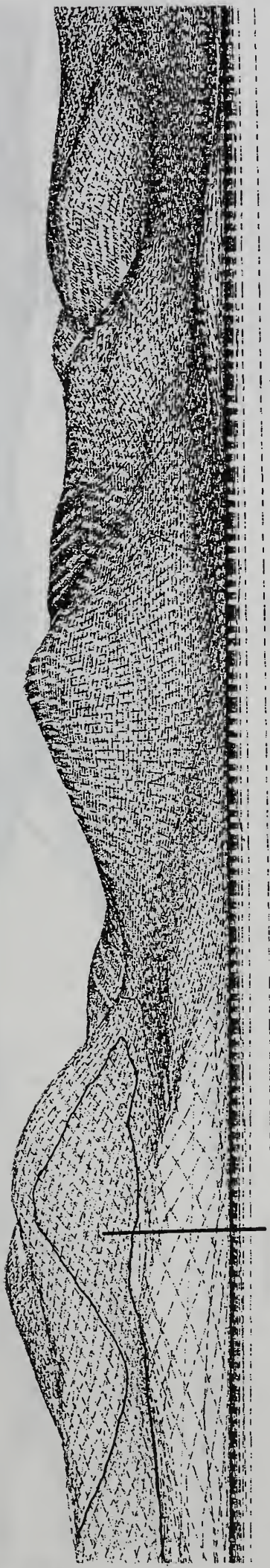


Figure Scenery-3: Eastern Passage Viewpoint, Alternative 2

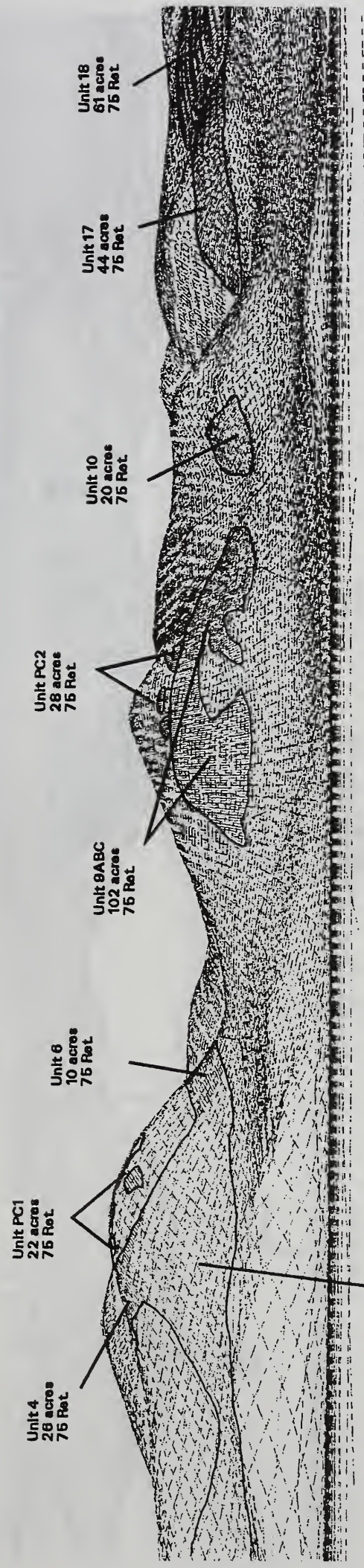
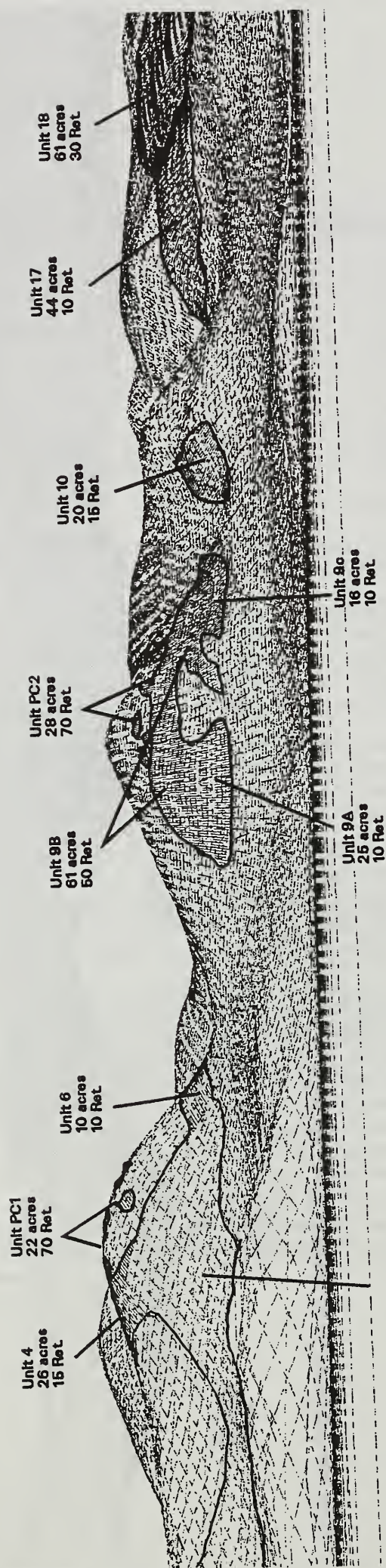
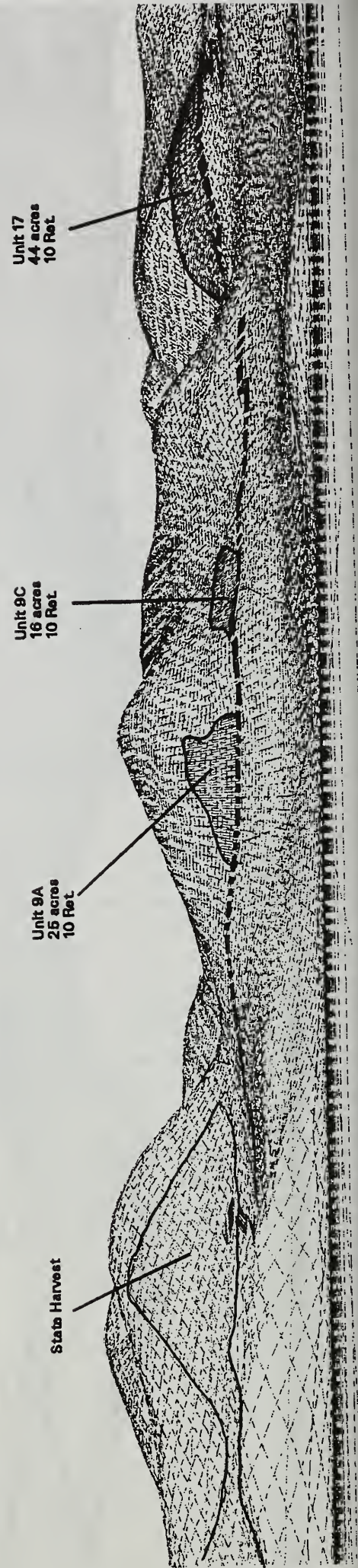


Figure Scenery-4: Eastern Passage Viewpoint, Alternative 3



State Harvest

Figure Scenery-5: Eastern Passage Viewpoint, Alternative 4



State Harvest

Figure Scenery-6: Eastern Passage Viewpoint, Alternative 5

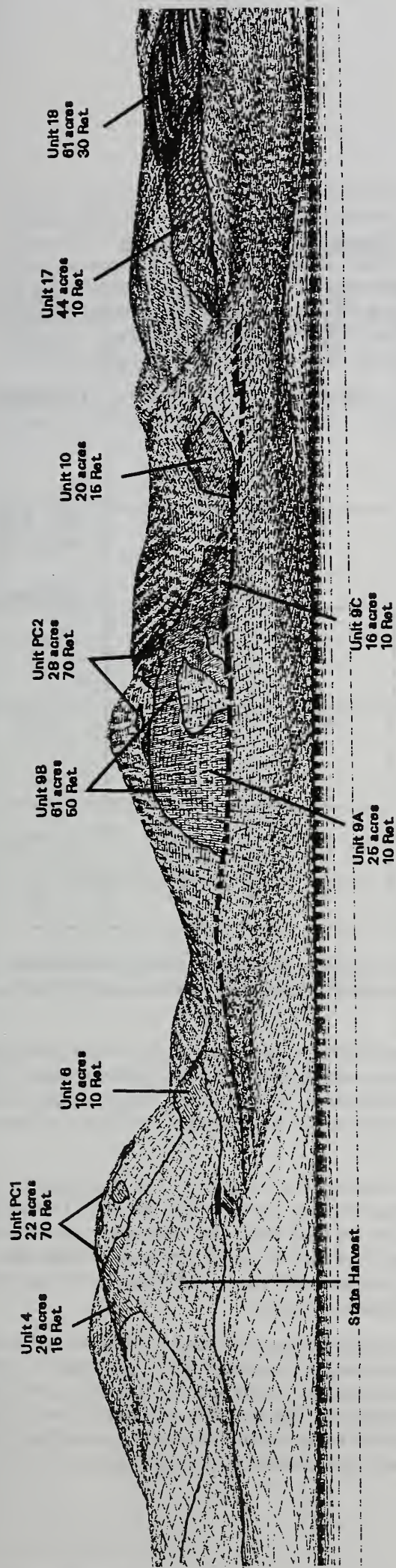
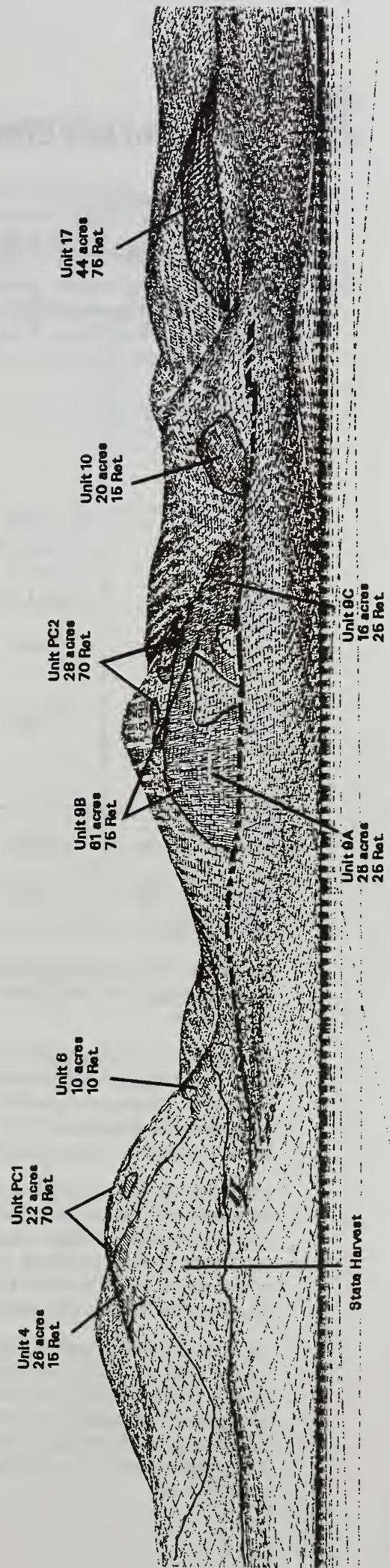


Figure Scenery-7: Eastern Passage Viewpoint, Alternative 6



3 Environment and Effects

Mill Creek Viewpoint

Table Scenery-2: Harvest Units Visible from the Mill Creek Viewpoint

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6
Units with 10-25% retention	0	0	4, 6, 9A, 9C, 17, 19, 23 (173 Acres)	9A, 9C, 17, 24B (95 acres)	4, 6, 9A, 9C, 17, 19, 23 (173 Acres)	4, 6, 9A, 9C, 23 (104 acres)
Units with 30-50% retention	0	0	9B, 18, 24 (215 acres)	0	9B, 18, 24 (215 acres)	0
Units with 70-75% retention	0	PC1, PC2, 4, 6, 9ABC, 17, 18, 19, 23, 24 (438 Acres)	PC1, PC2 (50 acres)	0	PC1, PC2 (50 acres)	PC1, PC2, 9B, 17, 24 (248 acres)
Total Seen Acres Harvested	0	438	438	95	438	352
Weighted Average of Retention	100%	75%	35%	10%	35%	57%
VQO Met on Forest Acres	R	PR/R	PR	PR	PR	PR
Overall VQO Met	M	M	M	M	M	M

Alternative 1 (see Figure Scenery 8) would result in no change to the existing view. The Retention VQO would be met on National Forest System lands, and the Modification VQO would continue to be met in the overall view.

Alternative 2 (see Figure Scenery 9) has the least impact of the proposed action alternatives. All harvest units would require 75% retention under this alternative, making them appear as textural changes in the landscape. Alternative 2 would easily meet the Partial Retention VQO from this viewpoint, and would likely meet the Retention VQO. The overall view would meet the Modification VQO due to existing harvest units on both State and Federal lands.

Alternative 4 would result in a slightly higher effect to scenery than Alternative 2, with 4 harvest units being visible from the Mill Creek Viewpoint (see Figure Scenery-11). Units 9A, 9B, and 17 would be viewed at an oblique angle, making them blend well into the landscape. Unit 24B would be viewed straight on, but the relative small size and narrow shape would serve to blend it very well into the landscape. Alternative 4 would meet the Partial Retention VQO on National Forest System lands, and would meet the Modification VQO in the overall view from the Mill Creek Viewpoint.

Alternative 6 (see Figure Scenery-13) would be more noticeable than Alternative 4, with 10 harvest units visible from the Mill Creek Viewpoint. The units in the southern portion of the project area (PC 1 and 2, units 4, 6, 9A, B, and C, and unit 17) would be viewed at oblique angles and would blend in well from this viewpoint. Only units 23 and 24 would be viewed straight on. The relatively small size of unit 23, and retention proposed in unit 24 would serve to mitigate their visual effect. Alternative 6 would meet the Partial Retention VQO on National Forest System lands, and would meet the Modification VQO in the overall view.

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Of the alternatives proposed, Alternatives 3 and 5 would have the most effect upon scenery, with 12 harvest units visible from the Mill Creek Viewpoint (see Figures Scenery 10 and Scenery-12). As in Alternative 6, the units in the southern portion of the project area would be viewed at oblique angles and blend well into the landscape. It is not likely that the roads proposed in Alternative 5 would be visible from this viewpoint. These alternatives would result in 4 units being viewed straight on (18, 19, 23, and 24). These units would be noticeable to the casual observer, but would not dominate the landscape due to the retention proposed (ranging from 10% in unit 23, to 50% in unit 24). Alternatives 3 and 5 would meet the Partial Retention VQO on National Forest System lands, and the Modification VQO in the overall view.

Figure Scenery-8: Mill Creek Viewpoint, Alternative 1

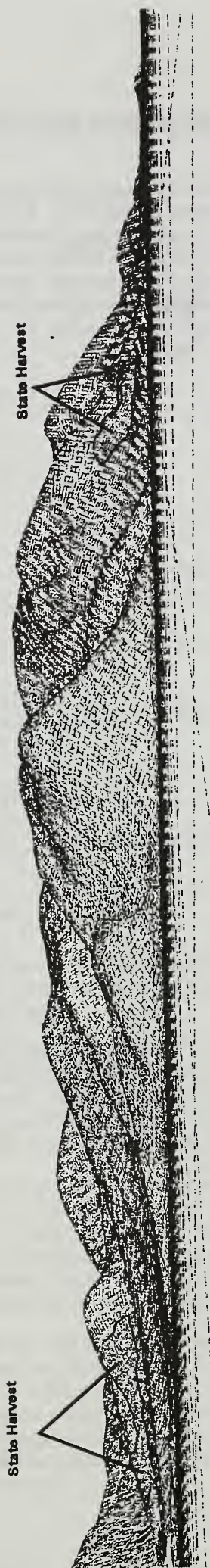


Figure Scenery-9: Mill Creek Viewpoint, Alternative 2

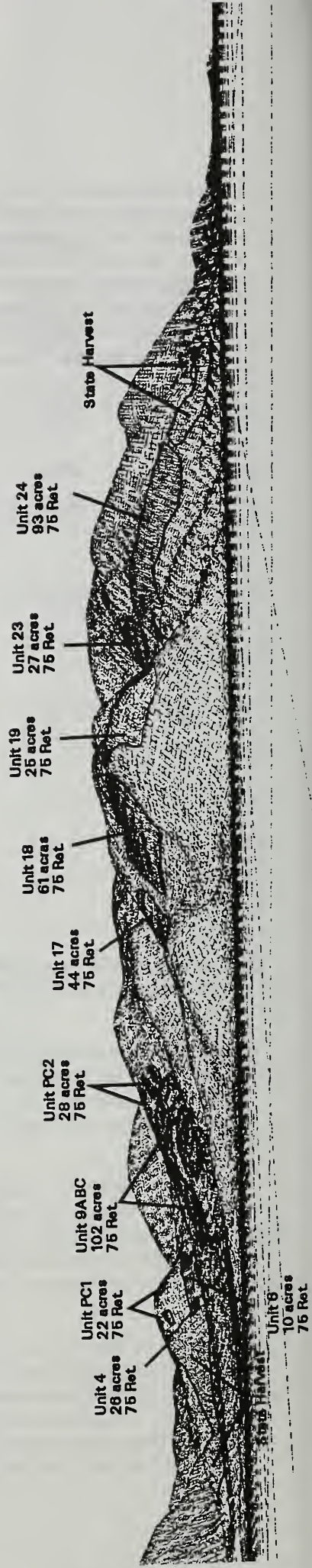


Figure Scenery-10: Mill Creek Viewpoint, Alternative 3

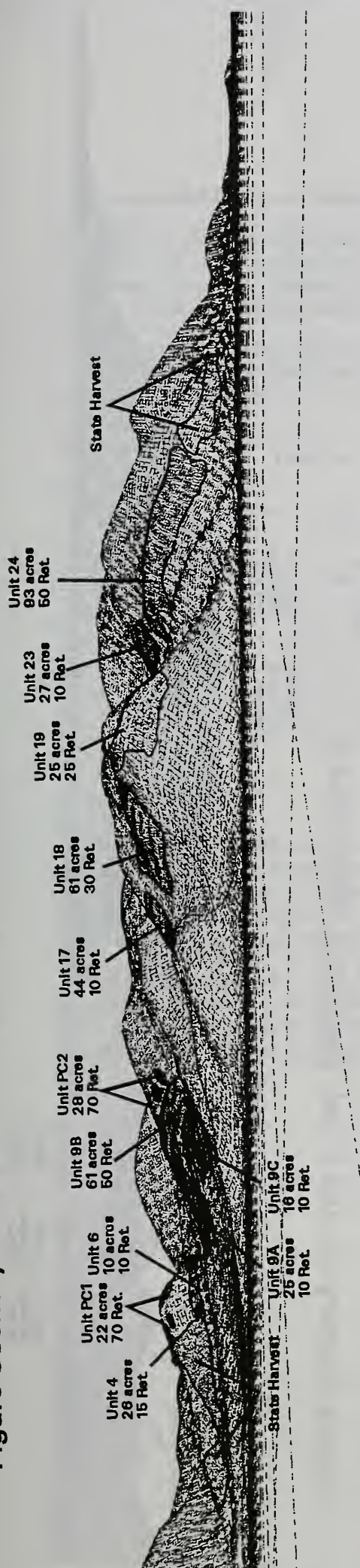


Figure Scenery-11: Mill Creek Viewpoint, Alternative 4

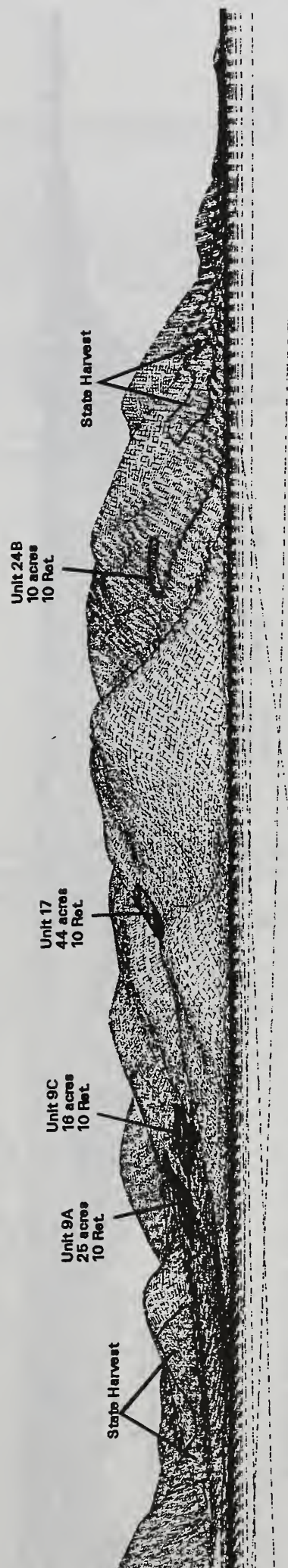


Figure Scenery 12: Mill Creek Viewpoint, Alternative 5

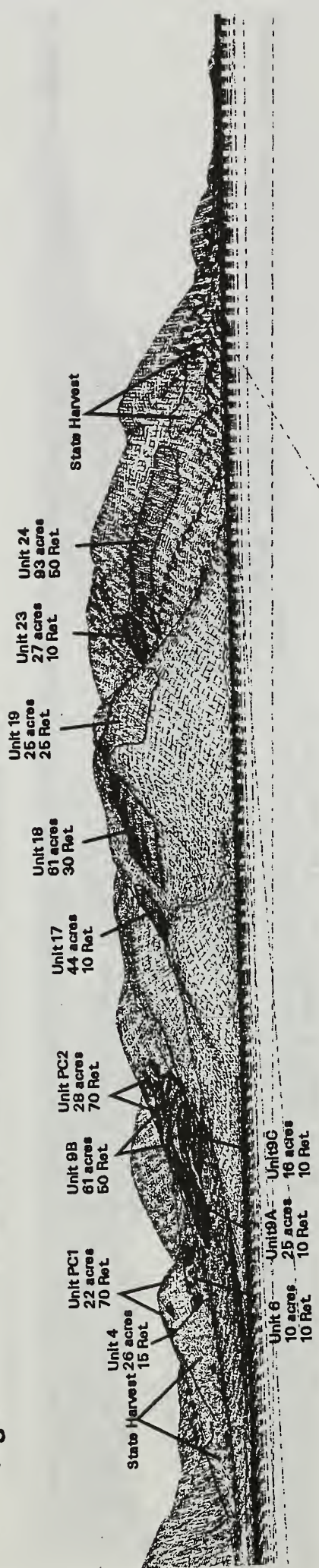
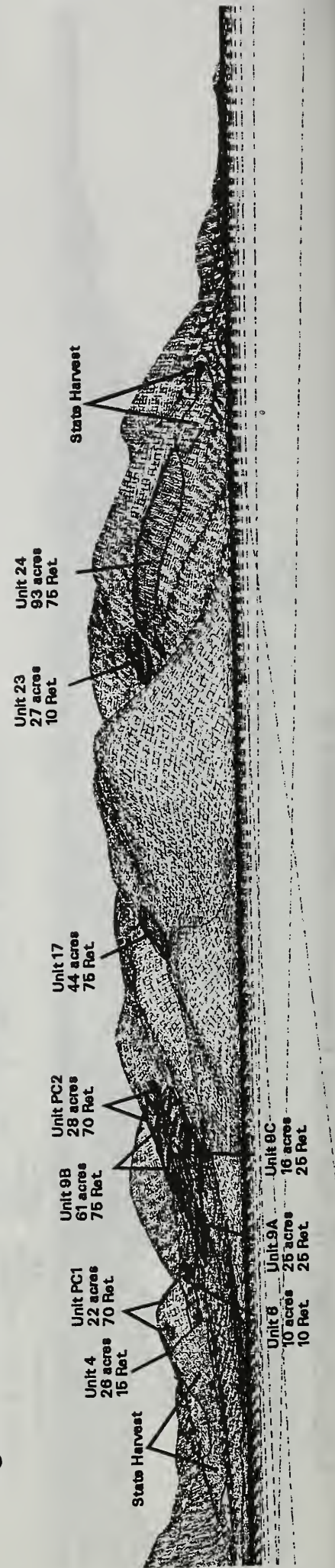


Figure Scenery-13: Mill Creek Viewpoint, Alternative 6



Cumulative Effects to Scenery

The State of Alaska is planning to conduct timber harvest activities directly adjacent to the Doughnut Project Area. The following information is from a report we received from the State entitled: *Department of Natural Resources, Division of Forestry, Coastal Region, Juneau Area; Five-Year Schedule of Timber Sales; Fiscal Year 2000 through 2004.*

The report describes the expected State harvest directly adjacent to the Doughnut Project Area. Figure Scenery-1 (Viewpoints) displays the existing and proposed harvest on State lands. All will be visible from the Mill Creek Viewpoint. Five of the proposed State harvest units will be visible from the Eastern Passage Viewpoint.

Table Scenery-3: Proposed State Harvest Units, 1999-2004

Calendar Year	Unit	Size	Volume
1999	EP1, Unit 2ext EP1, Unit 3	52 acres	1,429 MBF
2000	EP1, Unit 4	24 acres	600 MBF
2000	EP2, Unit 1	60 acres	1,500 MBF
2001	EP2, Unit 2	60 acres	1,500 MBF
2002	EP2, Unit 3	60 acres	1,500 MBF
2003	EP2, Units 4 and 5	30 acres	800 MBF
Total, next 5 years		286 acres	7,329 MBF

These State harvest units will change the VQO from Modification to Maximum Modification regardless of whether or not the Forest Service chooses an action alternative in the Doughnut project. Depending on the alternative selected by the Forest Service and the actual timing of the State harvest, there may be the potential to soften the edge effect on the boundary of State and Forest System lands through the design and layout on specific Forest Service units.

Implementing Alternatives 3, 4, 5, or 6 would add obvious harvest units that would increase the impacts to scenery. Alternative 2 is a light touch and likely would not be noticed by the casual observer, and would not add significantly to the scenery impacts. Alternative 1 does not propose any harvest at this time on National Forest System lands, and would not have any effect on scenery.

3 Environment and Effects

Issue 2 - Economics

Harvest Economics

Market Demand

Timber demand in Southeast Alaska varies dramatically from year to year. The level of demand is difficult to predict with precision. A variety of factors influence the demand for Southeast Alaskan timber. These factors include interest rates, housing markets, exchange rate fluctuations, national and international competition, regional and world markets, and timber availability and cost. Timber manufacturers in Southeast Alaska are in state of transition; various entrepreneurs are testing markets and trying new manufacturing techniques.

There are many variables that would affect the high cost of timber sale offerings that may carry significant economics risk for potential purchasers. High cost could be incurred as a result of road construction, helicopter logging, amount timber volume and value of timber being removed. Market stumpage values must be sufficient to cover this cost and offer a profit for potential purchasers. The timber economics for the project has the potential to affect the timber supply to the forest products industry. It may also have an affect on employment and the local communities of Southeast Alaska. The timber demand for the Tongass National Forest has been studied in detail.

Timber Supply

In order to maintain a stable timber sale program it is necessary to maintain a sale process to provide a continued flow of timber to the timber industry. The Forest Service has developed a program and process. The proposed Doughnut Timber Sale is a necessary component of the Forest Service's timber sale program, which requires a continuous pipeline of projects progressing through this program.

The Doughnut Project Area may have short and long term effects on supply and demand of wood. There are proposals that would provide the opportunity to have two sale offerings within a 5-year period, proposals for road development that would provide opportunities for future entries with use of developed road. The long-term supply may also be available depending on what percent of the suitable timber supply is being removed with the first entry.

Reasons for scheduling the Doughnut Project are included in Appendix D at the end of this document.

Effects

Economic Efficiency Analysis

Forest Service policy and handbook direction (FSH 2409.18 Amend. 901 and Supp. 6) requires an economic efficiency assessment to compare the benefits and costs of each proposed timber sale project. A Harvest Economic Efficiency Analysis was conducted to display a comparison between the action alternatives and is included in the project planning record. This analysis was run using the Residual Value Appraisal method. The analysis compares expected pond log values against estimated costs and arrives at an estimate of net stumpage values. The harvest economic efficiency of each action alternative is displayed in Econ. Table-1. Alternative 1, the no action alternative, is not displayed because there is no harvest associated with it.

The volumes in each alternative were estimated for saw log and utility that would be cut. These volumes are based on geographic information system (GIS) and field exams. Given an action alternative is selected, estimates are expected to vary from actual cruise volumes.

High and Low market scenarios are used to estimate each alternative's pond log value based on the alternative's estimated timber quality. The calculated pond log values are based on weighted averages for all sellers of products produced from Tongass National Forest timber sales. These market scenarios are used to display the cyclical nature of timber markets. They are not intended to display a final appraised stumpage value.

Stumpage value was calculated for each alternative by subtracting estimated stump to truck, transportation, logging overhead and road construction costs from the pond log value. Stump to was also included as a cost and subtracted from the pond log values per Forest Service Handbook 2409.18 The stumpage value does not include bid premiums that could result from competitive bidding for the timber when sold. It is assumed that Net Stumpage would show a higher value using the Transaction Evidence Appraisal.

The difference in net stumpage values between the action alternatives can be attributed to multiple factors including:

- Differences in species composition, volume per acre harvested, and timber quality
- Differences in the percentage of cable or helicopter yarding
- The amount of specified and temporary road construction

Econ. Table 1 Doughnut Timber Values and Costs to and Operator of Average Efficiency

ECONOMIC FACTOR	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6
Total Volume (MBF)	3,962	8,046	2,158	8,046	4,898
Acres	464	464	91	464	378
Harvest System(s)	H	H	C	H/C	H/C
POND LOG VALUE (\$/MBF)					
"High Market"/1/	430	430	464	430	430
"Low Market"/2/	224	224	233	224	224
COSTS (\$/MBF)					
Stump to Truck/3/	247	234	112	209	208
Transportation/4/	16	16	17	16	16
Logging Overhead	27	27	27	27	27
Temporary Road Cost			62		
Specified Road Cost			110	30	49
Profit & Risk "High"/5/	75	75	69	72	70
Profit & Risk "Low"/5/	54	54	45	52	49
NET STUMPAGE (\$/MBF)					
"High Market"/1/	66	78	68	76	60
"Low Market"/2/	-120	-108	-140	-110	-125
PAYMENTS TO THE STATE OF ALASKA					
High Market 25% to State/6/	64,878	155,891	36,416	151,868	72,858
Base Rate 25% to State/6/	5,769	11,715	3,918	11,715	7,131
High Market 7.12% to Wrangell /7/	4,619	11,099	2,593	10,813	5,187
Base Rate 7.12% to Wrangell /7/	410	834	279	834	507

/1/ Based on FSH 2409.22-95-2 1st Quarter 1995 data; lumber, pulp, and round log export are end products.

/2/ Based on FSH 2409.22-98-2 4th Quarter 1998 data; lumber, chips and round log export are end products.

/3/ Includes felling & bucking, yarding and log sort & load.

/4/ Includes truck haul (and delay) to closest mill.

/5/ Based on normal profit and risk.

/6/ 25% Fund Act payments (25% of net stumpage value and less \$0.50/mbf minimum payment to the U.S Treasury) to the State of Alaska.

/7/ 12% is Wrangell's average portion of the 25% Fund Act payments from the Tongass National Forest to the State of Alaska for Federal fiscal years 1994-1998.

3 Environment and Effects

Harvest Economic Efficiency Summary

The economic efficiency analysis produced net stumpage values ranging from \$60 per MBF for alternative 6 to \$78 per MBF for alternative 3 under a high market scenario. The low market net stumpage values range from -\$140 per MBF for alternative 4 to -\$108 per MBF for alternative 3. In summary Alternative 3 shows the highest net stumpage value. Alternative 5 is very close to alternative 3 with a slightly lower "high market" net stumpage value of \$76 per MBF. These two alternatives have the same estimated harvest volumes. Alternative 3 shows higher stump to truck costs as a result of the entire 8,046 MBF harvested by helicopter. Alternative 5 would build 1.4 miles of road and harvest 925 MBF by cable. Cable harvest is less expensive than helicopter harvest and would reduce stump to truck costs by \$38 per MBF as a result of less helicopter harvest per MBF and shorter helicopter yarding distances. Although alternative 5 has a lower stump to truck cost, net stumpage is reduced by \$30 per MBF due to road construction costs.

Alternative 4 has a higher pond log value due to a greater percentage of spruce (20%) compared to Alternatives 2, 3, 5 and 6 (15%).

Alternative 4 has the lowest stump to truck costs due to no helicopter yarding associated with this alternative.

Alternative 4 shows significantly lower stumpage values due to volume associated with road construction costs. Alt 4 harvests approximately 2,158 MBF and builds 2.6 miles of road.

Alternatives 5 and 6 show lower stump to truck costs than Alternatives 2 and 3. This is due to the construction of road allowing units 9A and 9C to be harvested by cable and shorter helicopter yarding distances.

The estimated harvest volumes, pond log values, costs and net stumpage values projected in this document at this time are not definitive figures. These estimates are useful for comparing the alternatives but should not be used for determining actual sale volume, costs or values. If one of the 5 action alternatives were chosen, volume cleared for harvest under the Doughnut EA would be offered in two separate contracts. Volume located south of Mom's creek would be offered separate from that volume to the north. This would allow for a northern sale offering utilizing proposed DNR road development scheduled for the year 2002. The use of the DNR road reduces helicopter-yarding distances for Alternatives 2, 3, 5, and 6 and provides an opportunity to build a spur road to access unit 17 in Alternative 4. Merchantable timber within units and any road right-of-way located on National Forest will be cruised to determine the quantity, quality and value of timber for the contract under which that volume of timber is offered. The final sale appraisals will include current quarter selling values, current cost information and a normal profit and risk allowance to determine the minimum advertised stumpage value at the time of offering. Competitive bidding will determine the actual value.

Overview of Pond Log Values

Pond log value is the selling value of end products (lumber, pulp, and round log export) minus the manufacturing costs of these products. Selling values and manufacturing costs are based on data from Forest Service Handbook 2409.22 Interim directives 95-2(1st Quarter 1995) and 98-2 (4th Quarter 1998) data. Pond log values are closely related to log size, grade and species composition.

Econ.Table 2

Pond Log Value	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6
"High Market" \$/MBF	430	430	464	430	430
"High Market" \$	1,703,660	3,459,780	1,001,312	1,703,660	2,106,140
"Low Market" \$/MBF	224	224	233	224	224
"Low Market" \$	887,488	1,802,304	502,814	1,802,304	1,097,152

Logging Systems

Economics has also been an important factor in choosing the yarding method. One of the most economical logging systems currently in use is cable yarding. One of the most expensive currently being used is helicopter. Depending on the Land Use Designation and meeting the prescription objectives, it may be within those parameters that influence what yarding system is best to use. Cable logging lends itself well when clearcut is the harvest prescription. Modifications to clearcutting have been used to meet visual, wildlife, or other resource concerns. The trees required to be left could impact the economics depending on how many trees are left, where they are located within the unit, and if downhill yarding or uphill yarding is required. In order for cable logging to occur an existing road must be in place or a road must be built. Road construction cost is a high expense and could affect the opportunity to use a cable system economically. Generally most of your small sale operators are set up to accommodate yarding with the use of cable systems and do not have the equipment or finances to use helicopter for yarding. Factors affecting helicopter yarding are discussed under the next table, Helicopter Economics Factors.

Econ. Table 3: Proposed Logging Systems

Yarding Methods	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6
Cable acres	0	0	91	41	41
Cable Volume	0	0	2,158	925	873
Helicopter acres	464	464	0	423	337
Helicopter volume	3,962	8,046	0	7,121	4,025

Helicopter Economics

Many factors greatly influence the economic viability of helicopter yarding and helicopter cost. The average yarding distance, volume of wood available, number of logs per MBF being yarded, the quality of the timber being removed, value of the timber being removed and turn time or how long it takes the helicopter to leave landing and return to landing with a load of logs. These factors must be considered to achieve the proper combination to meet reasonable production and lower helicopter cost.

Harvest prescriptions directly impact helicopter yarding cost depending on how many residual trees are required to remain within the unit and where they are located. Residual trees and where they are located may affect the ability of an operator to reach the proper combination of payload and turn time. The residual trees affect the search time needed to find the timber to be removed, and usually require additional time for the operator. It takes more time to maneuver in and out of a closed canopy than it does to move directly in and out of a more open unit.

The value of timber being removed affects the economics. The greater the value of timber being removed the more economically feasible it would be to require various harvest prescriptions and harvest methods. If the timber being removed is of high value it may be feasible to allow more residual trees within a harvest unit to be left or allow the opportunity to harvest a higher percent of the less operable stands within the project area. An operator may be able to yard at greater distances if logs being yarded are of higher value. The helicopter may be able to search longer if the bulk of logs to be yarded will bring higher returns to the operator. The helicopter yarding distances for alternatives 2, 3, 5 and 6 were analyzed using yarding distances associated with the development of DNR roads. Helicopter costs are estimates derived from the Helipace Program. Helipace was run using estimates for unit volume, yarding distances, canopy closure, restricting residual tree height, number of trees per acre and cut logs per acre for a BV 107-61A aircraft to produce helicopter yarding costs. These costs are displayed in Econ.Table 4.

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Econ. Table 4 Helicopter Economic Factors

	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6
Weighted Average Yarding Distance (feet)	3,281	3,237	N/A	2,422	2,205
Volume Flown (mbf)	3,962	8,046	0	7,121	4,025
Cost/MBF	189	177	0	165	171
Total Yarding Cost	750,197	1,426,436	0	1,172,755	689,219

Transportation System Development

Proposed road construction has an effect upon sale economics. Roads are generally very expensive to build. Cost of road building is derived from the miles of road being constructed, road location, amount of rock required, excavating required, bridge installation and culvert installation are just some of the variables that affect the cost of roads. To make it feasible to build road or pay for the road construction under a proposed timber sale, there must be a reasonable amount of volume having a reasonable value (stumpage) selected for harvest.

Roads being developed play a role in the economics of the sale. A road being developed may enable shorter helicopter yarding distances and develop the opportunity to use cable-yarding systems.

Roads being developed play a role for infrastructure for future sale management opportunities.

Specified roads are considered to be a higher road construction standard than temporary roads. Specified roads remain as a permanent road system and a temporary road is just that, a road built temporarily for harvest entry. Temporary roads will require closure prior to sale termination.

Econ. Table 5 Length of Road Construction

	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6
Specified Roads (Miles)	0	0	1.4	1.4	1.4
Specified Road Cost	0	0	238,000	238,000	238,000
Temporary Road (Miles)	0	0	1.2	0	0
Temporary Road Cost	0	0	132,000	0	
Total Road (miles)	0	0	2.6	1.4	1.4
Total Road (cost)	0	0	370,000	238,000	238,000

Species Distribution

Species considered for harvest affect the economics due to their differences in selling values. Historically yellow cedar has had the highest selling values with spruce being the next highest. Western red cedar and hemlock generally have the lowest value. Selling values are determined by market demand, quality of log, quality of log grades and defect in log. Depending on market influences species selling values fluctuate. The value of timber being removed and how much volume is being removed for each of the alternatives affects the economic viability for the sale.

Econ. Table 6 Species Distribution

Species	Alt 2		Alt 3		Alt 4		Alt 5		Alt 6	
	%	Vol. (MBF)	%	Vol.	%	Vol.	%	Vol.	%	Vol.
Hemlock	70	2,773	70	5,632	65	1,403	70	5,632	70	3,428
Spruce	15	595	15	1,207	20	432	15	1,207	15	735
Yellow Cedar	13	515	13	1,046	13	280	13	1,046	13	637
Red Cedar	2	79	2	161	2	43	2	161	2	98
Total		3,962		8,046		2,158		8,046		4,898

Affected Environment – Timber Resources

Doughnut Land Classification

The natural vegetation of the Doughnut Project Area is a mosaic of coniferous forest interspersed with non-forested plant communities such as muskeg (bog), shrubland and riparian plant communities. The Forest Plan (Appendix A) provides a detailed discussion of timber resource land suitability. This classification scheme is intended to show the amount of land that is covered by forest vegetation. These forested lands can be classified to show amount of land capable of, or available for, timber production. Land that is not capable of timber production is classified as non-productive forestland. This land includes areas of bare rock, alpine meadows, muskeg wetlands, and soils that only support scrub timber. Commercial forestland is that land considered suitable for timber production. Productive forestland must contain at least 8,000 board feet of net timber volume per acre. To be considered both available and suitable for harvest, lands must be determined tentatively suitable for timber production and must be within a land use designation that allows timber harvest. The entire Doughnut project area falls within the Scenic Viewshed Land Use Designation. Within this designation, Forest Plan Standards and Guidelines apply making additional areas unsuitable or unavailable for timber harvest. These include but are not limited to, the beach fringe, wildlife nest or den buffers, stream buffers, and oversteepened slopes.

Non-Interchangeable Components (NIC's)

The Forest Plan (pages 7-25 and 7-26) defines the Non-interchangeable components (NIC's) as the suitable land base and their contribution to the allowable sale quantity (ASQ) that are established to meet Forest plan objectives. The ASQ is divided into two non-interchangeable components based on economic factors. NIC I are those lands having normal operability. NIC II lands are those lands having difficult and isolated operability. The Forest Plan requires that NIC volumes be kept separate for planning and accounting purposes. The Doughnut Project Area contains both NIC I and NIC II volume. These volumes vary between alternatives due to proposed road location. Building roads in alternatives 4, 5 and 6 result in reclassification of some NIC II areas to NIC I, which is why Alternatives 4, 5 and 6 harvest a higher percentage of NIC I acres.

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Econ. Table 7 Doughnut Study Area NIC I and NIC II Acres

	Alts. 2 & 3	Alt. 4	Alt.5 & 6
NIC I Acres	730	1178	993
NIC II Acres	898	450	633
Totals:	1,648	1,648	1,648

Econ. Table 8 Proposed NIC Volume (MBF) Harvested

	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6
NIC I (MBF)	2,996	6,509	2,158	7,530	4,382
NIC II (MBF)	966	1,537	0	516	516
Totals:	3,962	8,046	2,158	8,046	4,898

Econ. Table 9 Alternative NIC Harvest Acres

	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6
NIC I (acres)	91	315	91	377	259
NIC II (acres)	32	91	0	29	29
Totals:	123	406	91	406	288

Econ. 10 Table compares acres harvested for all the action alternatives according to NIC I & II classifications.

Econ. Table 10 Harvest Percentage of NIC I & II, by Alternatives.

	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6
NIC I	74%	78%	100%	93%	90%
NIC II	26%	22%	0%	7%	10%
Totals:	100%	100%	100%	100%	100%

Environmental Consequences – Timber Resources

Suitable and Available Areas

Long-term sustainability is considered as the ability of the area to provide industry with a supply of wood fiber over the long-term. Timber harvest level related to the Doughnut Timber Sale would have a direct affect on the project area's long-term sustainability. For planning purposes all suitable lands within the project area are potentially available for harvest throughout the rotation. The rotation for a designated Scenic Viewshed is between 120 and 150 years. This means over the course of 120 to 150 years, stands of productive forest determined to be suitable for commercial timber production, shall be managed for their desired future condition. All Suitable land within the Doughnut Project Area is included in the Allowable Sale Quantity calculation for the Tongass. Field crews examined all stands of significant size within the Doughnut Project Area identified in the GIS database as suitable. From these examinations a unit pool and the six different alternatives were formed. Many stands throughout the project area showing as suitable in the Forest Plan (appendix A) were not included in the project unit pool. The associated costs with helicopter logging prohibit harvest of these stands with low volumes and poor quality wood at this time. These stands were left out of the unit pool due to excessive logging costs associated with managing these stands for timber production. These stands are characterized with poor stand conditions, including a higher than average percentage of wood defect, poor log grades and location requiring helicopter for harvest. Due to terrain and scenic viewshed objectives, road access is not a feasible option for these stands. A majority of the stands left out of the project unit pool are located at higher elevations between 1000 to 2000 feet above sea level. These stands consist of mountain hemlock, western hemlock and spruce having very poor grade and high levels of defect. Harvesting these stands during this rotation would require a considerable change in current timber market conditions and/or unforeseeable changes in wood processing technologies. Though these stands do not contribute to the project area's timber sale volume at this time, stands not harvested do provide for other resource values such as wildlife, watershed protection and scenic quality. Other suitable acres excluded from harvest include portions of stands within the unit pool. These areas were omitted from harvest in order to meet other resource concerns.

Econ. Table 12 Suitable and Available Acres Determined by GIS

	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6
Suitable and Available Acres	1,648	1,628	1,628	1,628	1,628	1,628
Harvest Acres	0	123	406	91	406	288
% of Suitable and Available Acres Harvested	0%	8%	25%	6%	25%	17%
Volume (MBF) Harvested	0	3,962	8,046	2,158	8,046	4,898
% of Available Volume Harvested	0	11%	22%	6%	22%	14%

As shown in Econ. Table 12, alternative 4 removes 6% of the Available Volume from the project area in the first entry. Alternatives 3 and 5 remove 22%. Stands selected for harvest in the action alternatives would be managed on a 120-year rotation. If an action alternative is selected the Doughnut Timber Sale would be the first scheduled entry. Throughout the rotation, future harvest entries scheduled for the project area would depend heavily on the volume remaining within the current unit pool after the first entry.

Harvest prescriptions for the Doughnut alternatives prescribe treatments for each harvest unit. Treatments include the harvest or regeneration of the stand, intermediate cuttings, and other cultural treatments necessary to achieve the stand's desired future condition. In order to meet Forest Standards and Guidelines for visuals and wildlife treatments for every harvest unit in every alternative retain some percentage of the existing stand. Retention percentage refers to the number of trees remaining within the unit after harvest.

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This percentage is based on the estimated number of trees per acre within the unit, prior to harvest. Trees per acre will be estimated for each unit from stand exam and cruise data collected in each unit. Retention for a particular unit may range from 10% for an alternative to 75% in a different alternative. Retention percentages are prescribed for a given unit in order to meet wildlife and scenic resources objectives. There is a volume associated with this retention. If the retention volume within a given harvest unit is high enough and the trees are not of poor merchantable quality, the retention volume is considered available for harvest over the rotation in this analysis. Over the rotation, residual volume in units retaining less than 25% of the original stand is not considered volume that would be harvested in a future entry. This volume is considered uneconomical to harvest under typical market conditions due to associated logging costs. Volume retained within these units most likely will not be recovered over the rotation for commercial harvest but serve as structure for wildlife and protection of small streams. Volume in units retaining more than 25% is considered feasible for future commercial harvest; for example; under alternative 3, retention of 50% is prescribed for unit 9B, this means 50% of the trees within unit 9B will remain in the unit after the first entry. Mostly trees in smaller diameter classes, exclusions within the harvest unit and individual trees marked for leave will represent this 50% retention in unit 9B. Most of the smaller diameter trees remaining after the first entry are expected to see increases in growth rates due to reduced competition. This volume retained from the first entry would contribute to the long-term sustainable flow of wood from the project area. This is not to imply that all the remaining volume would be harvested in these units but rather provide for the opportunity to harvest in the future. Econ. Table 13 shows the remaining volume after harvest within the unit pool for each Alternative.

Econ. Table 13 Doughnut Unit Pool Volumes

	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6
Unit Pool Estimated Volume (MBF)	11,231	11,231	11,231	11,231	11,231	11,231
Proposed Harvest Volume (MBF)	0	3,962	8,046	2,158	8,046	4,898
% of Unit Pool Volume Proposed for Harvest	0	35%	72%	19%	72%	44%
Remaining Volume After Harvest (MBF)	11,231	7,269	3,185	9,073	3,185	6,333

Alternative summary Econ. Table 14 illustrates the remaining percentage of trees retained over the treatment acreage for each harvest unit. Treatment acreage is the area associated with the unit prescription. The percent of retention prescribed for each unit refers to the percent of trees, 9 inches and larger at breast height, which will remain within the treatment area after the first entry. Econ. Table 15 illustrates the volume available for harvest after the first entry. This volume is derived from units that will retain 25% or more of their trees per acre after the first entry.

Econ. Table 14 Retained Volumes After First Entry

	Alt.		Alt.		Alt.		Alt.		Alt.	
	2		3		4		5		6	
Unit No.	Unit Acres	% Retained	Unit Acres	% Retained	Unit Acres	% Retained	Unit Acres	% Retained	Unit Acres	% Retained
4	25	75	25	15			25	15	25	15
6	10	75	10	10			10	10	10	10
9a	25	75	25	10	25	10	25	10	25	25
9b	61	75	61	50			61	50	61	70
9c	16	75	16	10	16	10	16	10	16	25
10	20	75	20	15			20	20	20	15
16	6	40	6	40			6	40	6	40
17	40	75	44	10	40	10	44	10	44	70
18	61	75	61	30			61	30		
19	25	75	25	25			25	25		
23	27	75	27	20			27	10	27	10
24	93	75	93	50			93	50	93	70
24b					10	10				
PC1	22	75	22	70			22	70	22	70
PC2	28	75	28	70			28	70	28	70

Future harvest entries into the Doughnut Project Area are evaluated over a 120 to 150 year rotation. These entries are potential timber sales that could happen sometime throughout the rotation. Alternatives 2 and 4 would tend to lead to more frequent entries to the Doughnut Project Area. Harvest entries into the project area would probably occur every 30 to 50 years based on similar volume entries staged over time. Future entries under alternative 2 would be less economical given no infrastructure (road) was developed in the first entry. Alternative 4, 5, and 6 would incur the cost of developing the road with the first entry. Future entries under alternative 4, 5 and 6 would benefit economically due to this road development. With the road in place, volume could be accessed by cable from the road system and helicopter yarding would be more efficient due to shorter yarding distances. Alternative 6 would provide for an entry every 40 to 60 years. Alternatives 3 and 5 harvest the most volume in the first entry and would provide for only one other major entry into the project area over the rotation.

Econ. Table 15 Retained Volume Available For Future Entries

Unit No.	Alt. 1		Alt. 2		Alt. 3		Alt. 4		Alt. 5		Alt. 6	
	% Retained	Volume Retained (MBF)	% Retained	Volume Retained (MBF)	% Retained	Volume Retained (MBF)	% Retained	Volume Retained (MBF)	% Retained	Volume Retained (MBF)	% Retained	Volume Retained (MBF)
4	100	598	75	389			100	598				
6	100	250	75	125								
9a	100	675	75	439							25	101
9b	100	1,525	75	915	50	601	100	1,525	50	601	75	860
9c	100	352	75	229								
10	100	540	75	351			100	540				
16	100	138	40	55	40	55	100	138	40	55	40	55
17	100	1,232	75	801							75	1,039
18	100	1,525	75	991	30	305	100	1,525	30	305	100	1,525
19	100	475	75	309	25	71	100	475	25	71	100	475
23	100	540	75	351			100	540				
24	100	2,325	75	1,511	50	921	89	2,075	50	921	75	1,511
24b ¹							10					
PC1	100	440	75	330	70	308	100	440	70	308	70	308
PC2	100	616	75	462	70	431	100	616	70	431	70	431
Total		11,231		7,258		2,692		8,472		2,692		6,305

¹ Unit 24b is that portion of unit 24 available for cable harvest.

Issue 3 - Wildlife Habitat

The Forest Plan protects old-growth dependent species through a system of old-growth reserves and Standards and Guidelines, which direct our management activities on the forest. At the Project-level we evaluate the quality and placement of nearby old-growth reserves and connections between the reserves (corridors). We also discuss effects on specific species such as; game animals, threatened or endangered wildlife, species sensitive to road development or species we have received comments on. Lastly, we consider the effects of past, present and future activities by looking at cumulative effects.

Affected Environment - Old Growth Reserves

Old-growth habitat is maintained for wildlife species through several components of The Forest Plan. The first is a forest-wide system of reserves designed to protect the integrity of the existing old-growth ecosystem. The reserve system includes three components; 1) all non-development lands, 2) a series of mapped large, medium and small reserves and 3) full protection of all islands smaller than 1,000 acres. Additional protection of habitat occurs within the 1000-foot beach and estuary buffers and riparian buffers. Lastly, old-growth habitat is maintained in areas through harvest prescriptions, which retain old-growth structure, and in areas with 200-year timber rotations (not Wrangell Island).

Wrangell Island contains a total of two medium old-growth reserves and five small reserves (Figure Wild-1). The Forest Plan states that each reserve within a Value Comparison Unit (VCU) must be of a certain size and contain a specific amount of productive forest. An interagency team of biologists evaluated the Wrangell reserves and made recommendations on their size and location (Robertson 2000). There are two small reserves bordering the Doughnut Timber Sale Project Area referred to as Pat's reserve and North Wrangell reserve (Figure Wild-2).

The Pat's reserve was placed in its existing location due to deer winter range, travel corridors and proximity to other reserves. The Pat's reserve contains one of the bigger blocks of unfragmented forest on the north end of Wrangell Island. This was identified as important habitat for deer through the use of models and based on field inventories (Robertson 2000). Deer winter range habitat inventory scores were comparable to scores within potential harvest units. The Pat's Reserve parallels the Pat Creek and Hermit Creek valley, which we believe, functions as an east/west travel corridor. This reserve was placed strategically between the North Reserve and the Salamander Reserve to the south.

The North Reserve meets the size and productive old-growth requirements of the Forest Plan when we include the non-development acres within the Municipal Watershed (Table Wild-1, Figure Wild-2). This reserve was designed to be in close proximity to the Stikine River. Field reviews of this reserve report potential marbled murrelet nests, rough-skinned newts, willow ptarmigan, white-winged crossbills, bear and wolf use (Robertson 2000). Several areas of high use and habitat value for deer were also observed. Interagency biologists who have considered this Forest Plan reserve did not recommend any changes other than minor boundary adjustments to follow natural features. We are not proposing any changes to the North Reserve with this project. Table Wildlife-1 displays size and productive old growth (Volstrata) in acres for the North Wrangell Small Old-Growth Reserve in VCU 475.

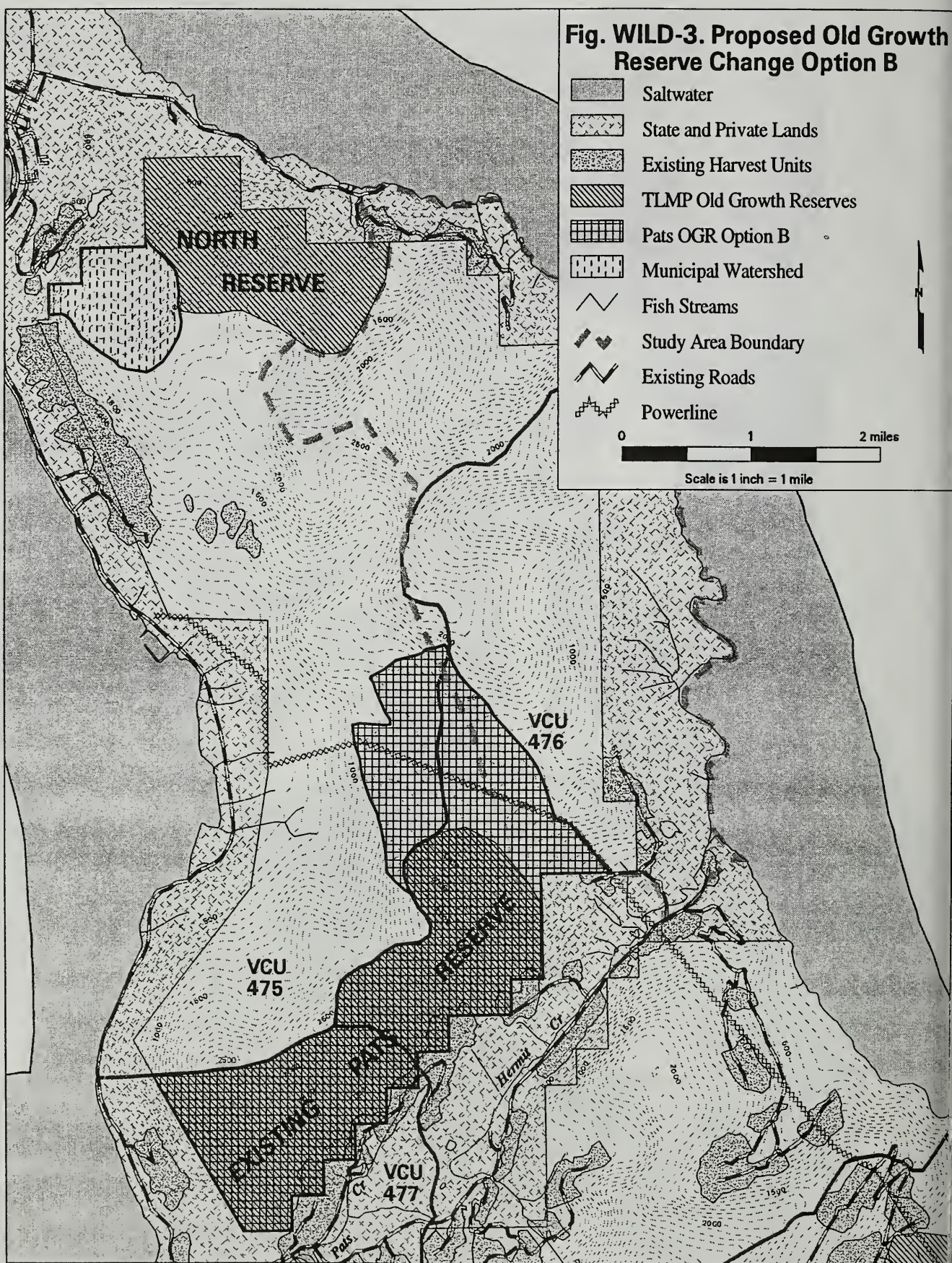
Table Wildlife-1 – North Old Growth Reserve size and productive old growth requirements and existing reserve

	Size	Low volume strata	Medium volume strata	High volume strata	Total productive old growth	Suitable productive old growth
Reserve requirements VCU 475	1305	NA	NA	NA	650	NA
Existing Reserve	*1400	130	410	550	**1090	820

* Includes 410 acres within adjacent Municipal Watershed

** Includes 280 acres within adjacent Municipal Watershed

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Environmental Consequences – Old Growth Reserves

The Pat's reserve parallels the Pat's creek valley and is located within two VCUs (V476 and V477, Figure Wild-2). The east portion of the reserve (V476) is approximately 200 acres shy of meeting the size requirements but has a sufficient amount of productive old growth. Option A would adjust this reserve to the power line to pick up these additional acres (Table Wild-2, Figure Wild-2). Option A would not meet the size or productive old-growth deficiencies for the west portion of Pat's reserve in V477. The west portion of the reserve is approximately 900 acres shy in size and 30 acres shy in productive old growth (Table Wild-3). Option B would adjust the Pat's reserve to add these acres (Table Wild-3, Figure Wild-3). This option would meet the size and productive old-growth requirements for both VCUs. This proposed change would result in 40% of the size acres and 3% of the old growth acres of V477 being met in adjacent VCUs. The Forest Plan requires that no more than 30% of the old growth acres be met in adjacent VCUs, but has no requirements on total acres. The only other way to meet all Forest Plan requirements for V477 and keep the reserve entirely within the VCU would be to move it south to the area north of McCormack's Creek.

Table Wildlife-2 displays size and productive old growth (POG) in acres for the eastern portion of the Pat's Small Old Growth Reserve in VCU 476 and Reserve Option A.

Table Wildlife-2

	Size	Low volume strata	Medium volume strata	High volume strata	Total POG	Suitable POG
Reserve requirements V476	1180	NA	NA	NA	590	NA
Existing East Reserve (V476)	977	60	270	310	640	600
Reserve Option A (V476)	1,188	80	270	310	660	620

Table Wildlife-3 displays size and productive old growth (POG) in acres for the western portion of Pat's Small Old Growth Reserve in VCU 477 and Reserve Option B.

Table Wildlife-3

	Size	Low volume strata	Medium volume strata	High volume strata	Total POG	Suitable POG
Reserve requirements V477	1910	NA	NA	NA	950	NA
Existing West Reserve (V477)	1024	50	200	675	920	770
*Reserve Option B (V476 and V477)	**3090	160	475	985	1620	1356

* These acres include East Pat's Reserve (Table-2) plus the addition. This option meets the requirements for V476 and V477.

**Approximately 40% of these acres are within V476 and V475.

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We propose Option B (Table Wild-3, Figure Wild-3) for adjusting the Pat's reserve since we believe this will meet the acreage requirements for both VCUs. Both options will add a small, forested stand east of the reserve and enhance corridor values. Both options also add acres of nonproductive forest, muskeg, lake and alpine habitats. We have seen quite a bit of deer summer use and bear sign within these habitats. The existing Pat's reserve is close to meeting Forest Plan requirements for productive old-growth but Option B would add the acres needed to meet the size requirement.

Affected Environment - Travel Corridors

We refer to wildlife travel routes as "corridors" and identify these areas during project analysis. Low elevation passes; beach fringe and stream corridors provide natural connections between forested blocks and are important areas for migratory wildlife species. These areas can become "pinch-points" to wildlife species if they provide the only migratory route between two blocks of forest. Forested corridors along slopes allow for the seasonal movement of certain wildlife species between summer and winter range. Corridors can be protected by not harvesting within them or by managing the habitat to retain forest structure.

The beach fringe is believed to be important as a wildlife travel corridor, as a transition zone between interior forest and salt-water influences, and as a unique habitat (or micro-climate). The beach fringe provides important low-elevation connectivity between watersheds that are separated by very steep sides and non-forested ridge tops. In conjunction with riparian areas, which provide connectivity within watersheds, the beach fringe is a component of the major travel corridor system used by many resident wildlife species. There are currently State harvest units in the beach fringe and we expect there to be more in the future. This increases the importance of corridors outside of the beach fringe on National Forest System lands.

Wrangell Island corridors were identified during the Wrangell Island Analysis process (USDA 1998, WIA). The Pat Creek-Hermit Creek drainage is one of two low elevation east/west corridors on the island; however, forested connections have been lost due to past timber harvesting and road building. A north/south corridor identified during our landscape analysis exists on the west side of Wrangell Island. The north/south corridor on the east side and within the project area is characterized by many "natural" breaks in forested cover

Wildlife corridors can be hard to locate on the ground and their actual use by wildlife for dispersal is difficult to quantify. For this project we focus on maintaining forested connections between the beach and higher elevation habitats and between the small reserves. *We consider all of the forested habitat within the project area to be important for north/south dispersal of wildlife species between reserves especially for species that avoid crossing openings or non-forested habitat.* The ability of National Forest System lands to function, as a corridor will become increasingly important if many of the adjacent State lands are harvested. There are also well-used game trails (corridors) in nearby muskeg and non-forested habitats that we do not expect to be affected by this project.

Environmental Consequences – Travel Corridors

In the Doughnut Project Area we are maintaining the function of forested corridors by deferring harvest in these areas or with lighter harvest prescriptions that retain more forest structure. Partial-cut units such as PC1 and PC2 were designed to leave more structure in areas where we saw a high amount of wildlife sign. Units 17, and 24 have higher retention in some alternatives to mitigate for State timber harvesting in the beach fringe. Units 18 and 19 have been removed from some alternatives for additional mitigation. In general, alternatives that leave more forest structure will have less of an effect on wildlife movement than those that leave less structure but the effect is difficult to measure. One method of measuring this effect is to look at the percentage of volume removed with each alternative. Since volume is a rough measure of forest structure, alternatives that remove more volume will retain less forest structure. . We expect alternatives 2 and 4 to be more responsive to corridor concerns than alternatives 3 and 5 and alternative 6 is somewhere in between.

The Forest Plan Beach and Estuary Standards and Guidelines state that the objective of the beach fringe is: *"To maintain the ecological integrity of beach and estuary fringe forested habitat to provide sustained*

natural habitat conditions and requirements for wildlife, fish, recreation, heritage, scenery and other resources...To provide a relatively continuous forested corridor linking terrestrial landscapes...".

Clarification of this intent states, "in some locations the past harvest is extensive enough that additional productive old growth beyond the beach fringe may be needed to meet the intent of the strategy. The project NEPA analysis should consider maintaining additional habitat in these locations in cooperation with the USFWS and ADF&G". Although the beach fringe in the Doughnut project area is on State land, we have included alternatives to provide corridor habitat in the event that beach habitat is harvested. Alternatives 2, 4 and 6 use light prescriptions in harvest units adjacent to existing or future State units.

Affected Environment - Deer

The Sitka Black-tailed Deer is an important subsistence species as well as a critical prey species for wolves. In heavy winters deer find forage within old-growth habitats where there is less snow cover. Light selection harvesting of trees within a stand may be beneficial in providing forage but heavy selection harvesting may be no better than clearcutting at maintaining enough structure to intercept snow (Kirchoff 1998).

Deer habitat model results and field surveys of deer use were not consistent. Due to the east-facing slopes this area did not receive high scores based on the model. Our field habitat inventories were highly variable and indicate that patches of high value habitat are interspersed with patches of low value (Robertsen 2000). We discovered a relatively high amount of deer sign within the project area as compared to other areas we have surveyed on Wrangell Island. High use areas were also discovered within both of the Small Old-Growth Reserves associated with this project (Robertsen 2000).

To quantify the difference between alternatives, we determine how many deer an area can support by using a Habitat Capability Model. Variables important in the model include: timber volume, post-harvest types, snow accumulation, elevation, aspect and predators. Researchers recommend areas capable of supporting 18 deer/square mile to sustain adequate deer densities for both wolf and human predation (Person et.al. 1997). Table Wild - 4 displays the change in high value habitat by alternative. Figure Wild- 4 and Wild-5 show existing deer habitat capability within the project area, the unit pool and nearby reserves.

Environmental Consequences - Deer

None of the action alternatives affect high value deer habitat (Table Wild-4). There are small differences in the alternatives and effects on medium value habitat. Alternative 4 has the least effect on habitat but builds the entire road system, which will increase hunting pressure on game populations. Alternative 6 has fewer habitat effects than alternatives 3 and 5 but also builds the entire road system. We expect that Alternative 2 will have the least effect on the deer population followed by 4, 6, 3 and 5. Table Wildlife-4 displays the acres of high, medium and low value deer and high value marten habitat remaining following this entry into the project area.

Table Wildlife-4. Acres of high, medium and low value deer and high value marten habitats remaining, by alternative, with this entry for the project area.

Habitat Type	Existing acres in VCU	Acres Remaining Alt2	Acres Remaining Alt3	Acres Remaining Alt4	Acres Remaining Alt5	Acres Remaining Alt6
Deer high value (This score >= 0.67)	110	110	110	110	110	110
Deer medium value	2214	2147	2127	2174	2127	2138
Deer low value	1945	2012	2032	1985	2032	2021
Marten (high volume, less than 1500' elev.)	1476	1209	1209	1422	1209	1287

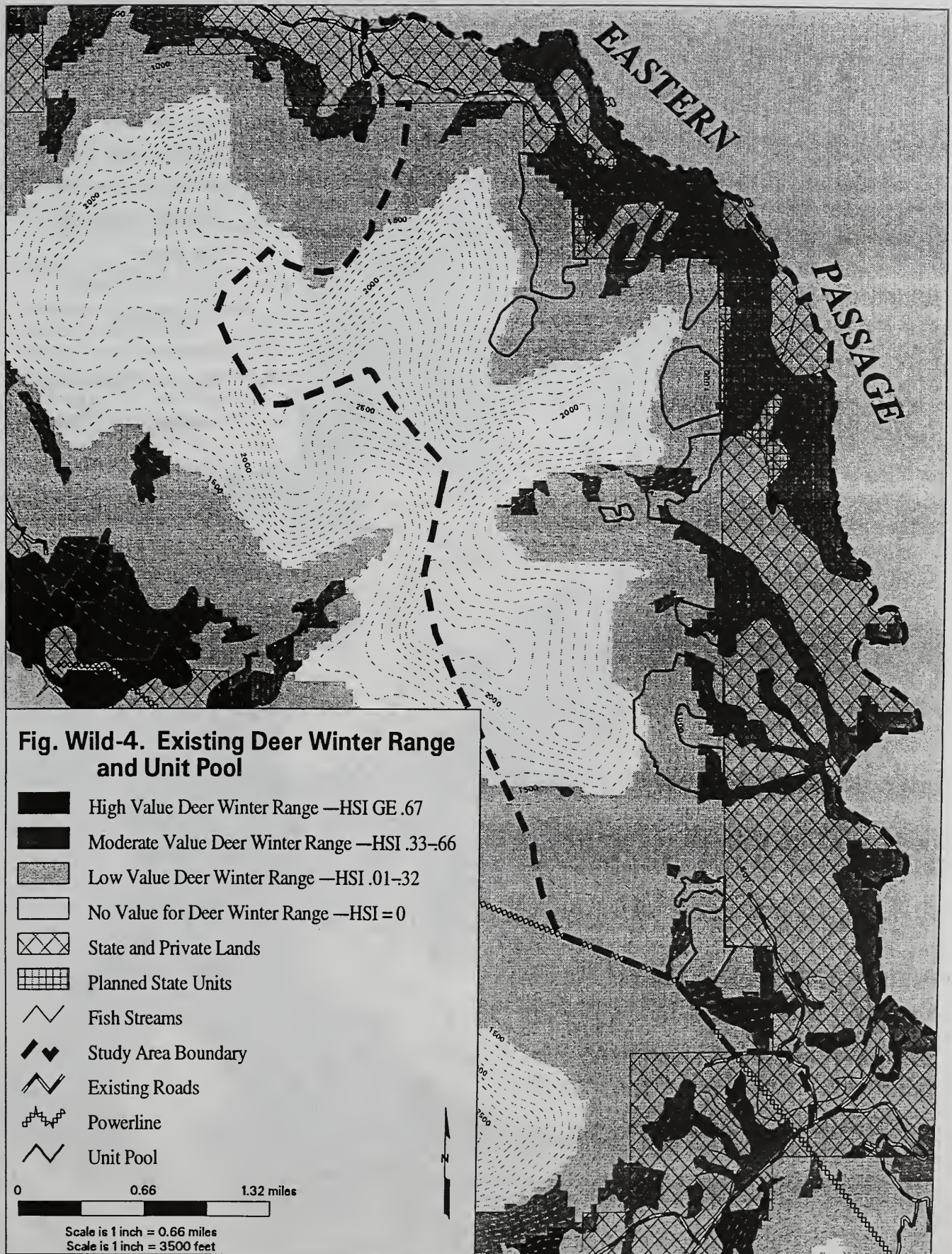
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Habitat capability models are used to generate crude estimates of deer numbers that are used to analyze impacts on subsistence. However, these numbers should be viewed with caution since habitat capability models consider only habitat and none of the other factors that affect population size such as mortality rates, birth rates and dispersal. These numbers also reflect “habitat potential” or “capability” and not existing population size. Table Wild-5 displays the change in habitat capability in deer numbers by alternative.

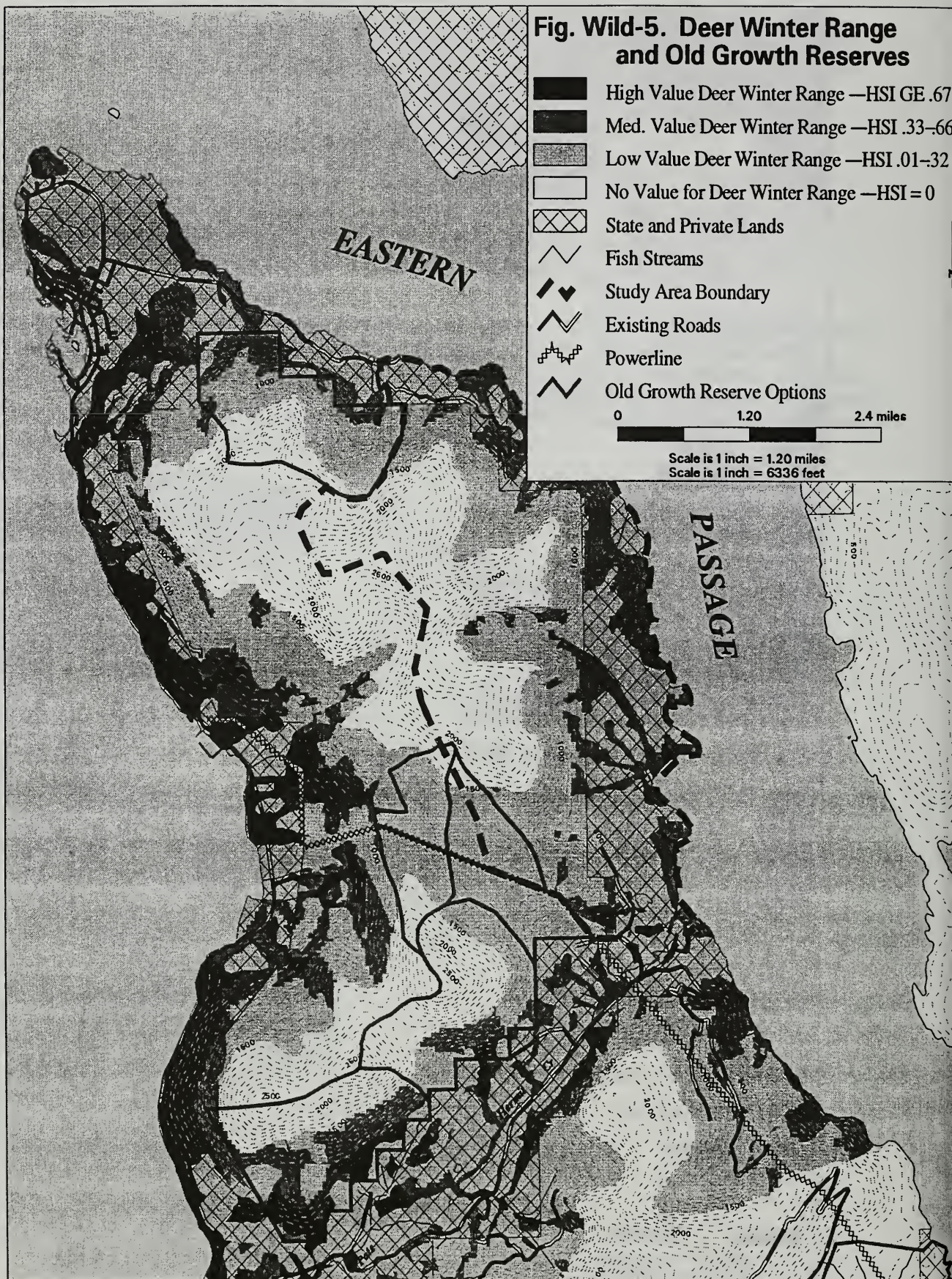
Table Wildlife – 5. Habitat capability in deer/sq mile by alternative for the project area.

	Existing	Alt2	Alt3	Alt4	Alt5	Alt6
# of Deer	227	219	215	224	215	219
Deer/sq mile	24	23	23	24	23	23

According to the model, habitat capability will be maintained in the project area at 23 deer/square mile or more under any alternative. Island wide, The Forest Plan predicts that there will be enough habitat capability for 15 deer/sq mile by the year 2095 with wolf predation factored in (Forest Plan, 1997). The subsistence analysis for this project states that there is a “significant possibility of a significant restriction” as a result of cumulative effects, the effect of habitat perturbations on a small population and the possibility of high demand for deer on the island.



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Affected Environment - Marten

There is a concern for marten populations due to the fact that it is a small-medium sized mammal, somewhat dependent on old-growth forest and sensitive to human use of roads. The Forest Plan identifies high value marten habitat as high-volume old growth stands below 1500' in elevation. Table Wildlife – 4 shows the number of acres of high value marten habitat harvested by alternative. Figure Wild-6 shows the distribution of high value marten habitat. Although Alternative 4 has less of an effect on habitat than other alternatives with this entry, it is very likely that more timber harvesting would take place in the near future once the entire road has been constructed.

Environmental Consequences - Marten

Studies on Chichagof Island indicate that a road density above 0.2 mile/sq mile can lead to increased mortality and trapping. Table Wildlife-6 displays road density by alternative when calculated for the project area as a result of this sale and cumulatively over the next ten years. All roads (other than temporary roads in alternative 4) will be open for public use upon completion of the timber sale. Alternatives 4, 5 and 6 are expected to have greater cumulative effects as a result of the development of a loop road on State lands. Actions proposed in Alternatives 4, 5 and 6 results in the highest road densities. Alternatives 2 and 3 have the lowest road density of any of the alternatives. Looking at both road and habitat effects, we rate the alternatives as comparable in their effect on marten populations.

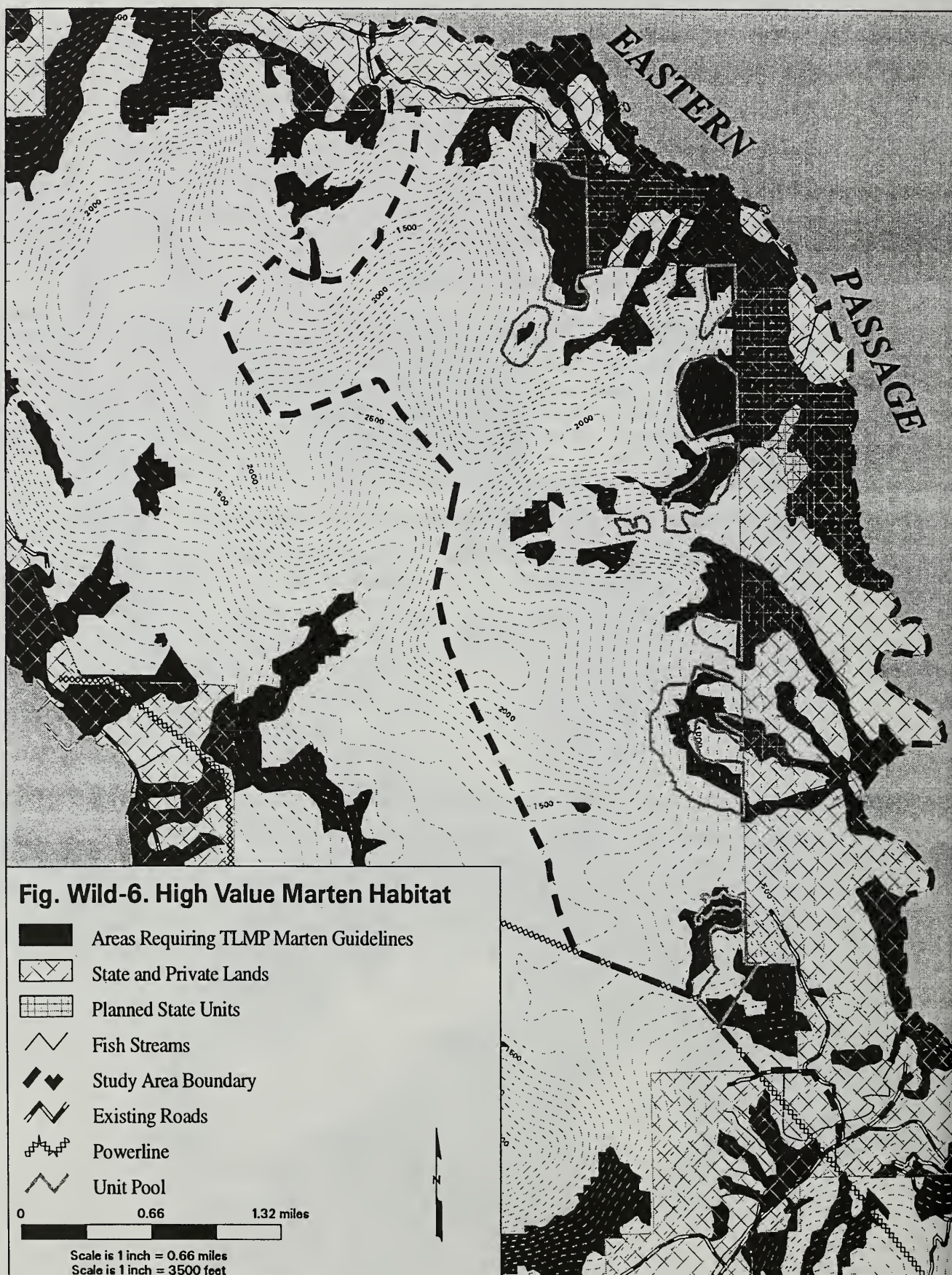
Table Wildlife-6. Road density (miles road/sq mile) by alternative for the Project Area.

Alternative	Road density for the Project Area	*Cumulative Effects of road density in the Project Area in 10 years
1	0.72	0.98
2	0.72	0.98
3	0.72	0.98
4	1.04	1.36
5	0.92	1.24
6	0.92	1.24

* Numbers are based on the assumption that the loop road will be constructed in alternatives 4,5 and 6.

To meet Forest Plan Standards we will retain forest structure within harvest units that contain high value marten habitat by leaving at least seven large diameter trees/acre. We will designate leave trees through prescriptions and leave-tree marking. In some areas we will widen stream buffers to enhance their corridor value and retain the required trees. Wherever possible, we will locate structure “within the interior of the unit rather than along the perimeter of the harvest unit” but structure may be dispersed or clumped depending on site conditions. Every attempt will be made to retain structure on the portion of the units that are high value (USDA 1998).

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Affected Environment - Wolf

The Alexander Archipelago wolf is considered a species of concern and wolf habitat needs were a key consideration in the development of the new Forest Plan. Wolves in Southeast Alaska prey on Sitka black-tailed deer, moose, mountain goat, beaver, black bear, spawning salmon and geese. The total population is estimated at fewer than one thousand individuals in all of Southeast Alaska with approximately 200 being harvested annually (Kirchhoff 1991).

Two viability concerns for the wolf were addressed in the Forest Plan: 1) the short-term concern involves increased wolf harvest and 2) the long-term concern involves large reductions in deer habitat capability (USDA Forest Service, 1997). The greatest area of concern over wolf harvesting is for north Prince of Wales, where wolf harvests may be high relative to the existing population. A Habitat Capability of 18 deer/sq. mile is recommended to support both wolves and a huntable deer population (Person et. al. 1997). The Forest Plan predicts a habitat capability of 15 deer/sq mile for Wrangell Island in 2095 with wolf predation factored in, however, there is much dispute over these numbers (Person et. al. 1997).

Table Wildlife-6 displays the road density for the project area by alternative. Open road density on Wrangell Island is 0.65 miles/square mile. Road density for the ecological province is expected to be lower than for Wrangell Island due to the inclusion of many more unroaded areas (Etolin Wilderness area, Woronkofski...).

Environmental Consequences - Wolf

Roads increase the risk to wolf viability due to the potential for an increase in hunting, trapping and poaching. Of the wolves killed in GMU 2 since 1985, 46% were taken along the road system (cited in Kirchhoff 1991). The management of roads is an important component of the Forest Plan wolf conservation strategy. The 1999 Record of Decision for the Forest Plan modified the Standard and Guide within the Alexander Archipelago wolf section to state: *"open road densities of 0.7 miles or less per square mile are necessary to reduce mortality to sustainable levels."* We are directed to implement this Standard only when wolf mortality concerns have been identified and to calculate road density for the ecological province or combined islands (USDA 1999).

A wolf mortality concern has not been formally identified for Wrangell Island or GMU3 but wolf harvests have increased in the last decade. The project area is very close to the town of Wrangell and wolf mortality near town is high due to hunting, trapping and poaching (Robertson, pers. observ.) therefore we rate road density as the most important factor in rating the alternatives. Alternative 2 will be the most responsive to wolf concerns followed by alternative 3, 4, 6 and 5. All alternatives will meet the 1999 Record of Decision regarding the open road density standard as applied to Wrangell Island.

Affected Environment – Goshawk and Other Birds of Prey

Two subspecies of the northern goshawk (*Accipiter gentilis atricapillus* and *Accipiter gentilis laingi*) are old-growth/mature forest associated raptors of special concern on the Tongass National Forest and a key consideration for the viability assessment of the new Forest Plan (Iverson et al. 1996, USDA Forest Service, 1997). Concern for the goshawk stems from reductions in preferred habitat due to timber harvesting. The Forest Plan provides for goshawk viability through low or no-harvest land allocations and standards and guidelines for protecting nest sites.

Goshawks make extensive use of productive old growth forests for foraging and nesting. Radio-telemetry studies of goshawks on the Tongass indicate habitat selection for medium to very high volume old-growth forest (Iverson et al. 1996). Iverson et al (1996) reported 68% of radio-collared goshawk relocations in productive old growth and 3.7% of the relocations in young, second growth forests. Productive old growth forests support a wider range of important prey than do other habitat cover types (Iverson et al. 1996). Recommendations for maintaining goshawk viability include maintaining 1/3 of the landscape in 0-100 year old stands, 1/3 in 100-200 year old stands, and 1/3 in 200-300 or older stands (high value). Beach, estuary and riparian habitats generally support greater prey diversity and net prey productivity, features important to goshawk habitat quality (USDA Forest Service, 1997).

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We conducted courtship surveys and broadcast surveys in the Doughnut Project Area in 1998 and 1999. One goshawk nest was located as a result of a courtship survey in 1999. Current standards direct the Forest Service to "maintain an area of not less than 100 acres of Productive Old Growth generally centered around the nest tree" (USDA Forest Service, 1997).

Environmental Consequences – Goshawk and Other Birds of Prey

The Forest Plan addresses goshawk viability and we are implementing the goshawk Standards and Guidelines accordingly. To meet Forest Plan standards a nest buffer of 100 acres has been designed for the nest to include productive old growth with structure that is similar to the nest site. This nest buffer was designed with the assistance of an ADF&G goshawk biologist. We will mitigate disturbance near the nest in these alternatives by "allowing no continuous disturbance likely to result in nest abandonment within the surrounding 600 feet from March 15 to August 15." Although we will follow all Forest Plan Standards and Guidelines, alternatives that retain more old-growth structure will be the most responsive to goshawk concerns. Using these criteria, we expect that alternative 4 will be the most responsive to goshawk concerns followed by alternatives 2, 6, 3 and 5. Alternative 4 is the only alternative that currently has no harvest units adjacent to the 100-acre nest buffer.

Other raptors heard or seen within the project area include a Northern Pygmy Owl, a Sharp-shinned Hawk and a Red-tailed Hawk. Northern Pygmy Owls were heard but could not be located in Unit 24 and east of Unit 4. A Red-tailed Hawk nest was located east and outside of Unit 24. A Sharp-shinned Hawk pair was observed hunting in a clearcut unit north of Unit 24. We will implement all Forest Plan Standards and Guidelines with regard to raptor nests and disturbance:

"Active nests will be protected with a forested 600 foot wind firm buffer, where available. Road construction through the buffer is discouraged. Prevent disturbance during the active nesting season (generally March 1 to July 31)."

There are two historic Bald Eagle nests located on the beach near the project area but on State land. We will follow Forest Plan Standards and the Interagency Agreement established with the U.S. Fish and Wildlife Service to maintain habitat to support long-term nesting, perching and winter roosting habitat capability for eagles by avoiding disturbance to these nests during logging activities.

Affected Environment - Endemic Mammals

The Forest Plan directs us to conduct small mammal trapping on islands larger than 50,000 acres if there is a high likelihood that endemic taxa are present that may be affected by the proposed project. Scientists with the Forestry Sciences Lab began a small mammal study on Wrangell Island in 1997 to look at habitat associations and the relationship between habitat type and population performance (Robertsen 2000). As of this date, the Wrangell Island red-backed vole, *Clethrionomys gapperi wrangelli*, is the only endemic species we know of.

Environmental Consequences – Endemic Mammals

We are also directed to assess the risk of the proposed project on endemic mammals. Evaluating the risk of a project to endemic mammals requires consideration of numerous factors. Those factors include distinctiveness of taxa; population size; degree of isolation; island size; and habitat associations relative to the proposed management activity (USDA 1997). These are questions that the Forestry Sciences Lab will be addressing over the next few years.

Cumulative Effects - Wildlife

We considered future timber sale units over the next ten years, along with past sales to look at cumulative effects for deer and marten for the Pats and North Wrangell Landscape Unit (USDA 1998, WIA). Effects on habitat as a result of future and past timber sales on the north end of Wrangell Island are displayed in Table Wild-7. Future sales considered in this analysis include those on State lands adjacent to the project area and the Zimovia and Institute Sale (USDA 1998). To model effects of Forest Service sales we randomly selected 30% of the suitable ground within these project areas. We assumed that all potential State units would be clearcut. The two old-growth reserves on the north end provide habitat for old-growth

species that will not be harvested. Table WILDLIFE-7 displays the percent of high value deer and marten habitats that remains high by alternative for these landscape units, over the next 10 years. There is little difference in cumulative effects on habitat for these two species between alternatives.

Table Wildlife-7. Percent of high value deer and marten habitats that remain unharvested by alternative over the next 10 years for the north end of Wrangell Island.

Species	Existing acres in North Wrangell and Pats LU	% High Value Remaining Alt1	% High Value Remaining Alt2	% High Value Remaining Alt3	% High Value Remaining Alt4	% High Value Remaining Alt5	% High Value Remaining Alt6
Deer	2506 ac	96	96	96	96	96	96
Marten	7409 ac	92	89	89	91	88	89

Table Wild-6 shows future road density for the project area, which exceeds the thresholds recommended for marten and wolf. Due to the majority of roads occurring on DNR lands, we don't have much control over some percentage of total road density. However, we are directed to use the ecological province when calculating this measure for the wolf, which includes Zarembo, Etolin, Woronkofski and all of Wrangell Island. It is unlikely that we will exceed the 0.7-miles/square mile threshold for the ecological province even with the new roads associated with sales on these islands.

Another cumulative effect is the development of a snowmobile trail on the south end of the project area. Part of this trail will pass through the Pat's Old Growth Reserve and access high country within the reserve. This was discussed during an interagency meeting between biologists on Wrangell Island reserves and a consensus was reached that the impacts of this trail would be minimal (Robertsen 2000).

Issue 4 – Access Management

Public concerns were received which questioned the need for road development, citing increased erosion, sedimentation, and loss of habitat. Other comments received included support of road building for timber access. The local community expressed a high level of interest in increased recreation access resulting from road development, including support of a loop road connecting the Pat Creek Road with the State Wrangell East highway (locally known as the “Spur Road”) to the north. Both the direct effects of road building on soils, water, wildlife, and visual quality, and the indirect effects on wildlife, subsistence, and recreation are included in the issue. Forest roads are classified as either permanent roads (Forest Development Roads) or temporary roads. Permanent roads are developed and operated for long-term resource management purposes. These roads receive constant or intermittent use depending upon timing of timber harvest. Permanent roads form the primary transportation network in the Project Area. A temporary road is a short-term road developed and maintained for a limited time period. Current timber sale contracts require closure of temporary roads. This is an erosion control obligation of the timber purchaser and cannot be waived. Closure is achieved by blocking access, removing culverts and bridges, and restoring natural surface drainage patterns. Revegetating the surface of temporary roads by seeding with grass may be done when necessary to mitigate erosion and sedimentation.

Affected Environment – Access Management

There is an extensive road system on Wrangell Island that is comprised of State Highways, municipal roads, and National Forest transportation system roads. The Doughnut Project Area and associated roads are located on the northeast portion of the island.

Currently, there are two roads in the Doughnut Project Area. These roads, constructed by the DNR to access and manage their timber resources, extend into the project area from the north and the south. The existing northerly road is an extension of the State “Spur Road” which travels approximately 1.5 miles into the Project Area. The DNR plans on extending the northerly road approximately 2 miles further into the project area. The existing southerly road begins at a junction with the Pat Lake Road and travels approximately 1.3 miles into the Project area. Alternatives that build road would extend this road up to 1.4 miles.

The Forest Service and the DNR have in place a Construction and Use Agreement for existing roads and planned roads on Wrangell Island. This agreement includes roads that are mutually beneficial for accessing forested lands for timber management. The Agreement Area consists of adjoining National Forest and DNR forestlands that are accessible by a common road location. Under this agreement we are permitted to jointly use roads on National Forest System lands or DNR lands and share maintenance responsibilities commensurate with use. Existing and planned roads in the Doughnut Project Area and planned project roads constructed by the Forest Service or the DNR are included in the agreement.

The Forest Plan assigned a Scenic Viewshed LUD to the Project Area that allows road development.

Traffic Management Strategy

The Forest Service generally implements one or more of five traffic management strategies, as appropriate. These strategies are as follows:

1. **Encourage.** The Forest Service would include destination signing at the entrance to the road in conjunction with the route marker. The road is shown on Forest visitor maps. Roads having this strategy would be maintained at Level 2.
2. **Accept.** The Forest Service would provide only a route marker at the road entrance. If map clarity can be maintained we would show the route on Forest visitor maps. Roads having this strategy would be maintained at Level 2.
3. **Discourage.** Normally this would be accomplished by warning or information signs and by treating the road surface at the beginning of the road to be very rough and uncomfortable for passenger vehicles. Roads having this strategy would be maintained at Level 2.
4. **Eliminate.** The road would be physically blocked to traffic by culvert removal, gates, or berms. Roads having this strategy would be maintained at Level 1.

5. Prohibit. In addition to physically blocking the road to traffic, the closure would be legally enforced. Roads having this strategy would be maintained at Level 1.

Road Maintenance Strategy

Road maintenance includes the repair or upkeep of a road necessary to retain the road's traffic service level. The amount and level of maintenance is dependent upon traffic management objectives and maintenance criteria. After construction, roads may be maintained at one level during project implementation and maintained at a different level after the Project. The operational maintenance level is the level currently assigned to a road considering today's needs, road condition, budget constraints, and environmental concerns; in other words, it defines the level that roads in the Doughnut area would be maintained during the timber sale. The objective maintenance level is the level to be assigned after timber harvest, considering future road management objectives, traffic needs, budget constraints, and environmental concerns. Maintenance levels vary from the least amount of maintenance (Level 1) to the greatest amount of maintenance (Level 5). Level 1 maintenance is assigned to roads that are closed, with only basic custodial maintenance performed to protect road investments and protect adjacent resources. Level 5 maintenance is assigned to roads requiring a high degree of user comfort and convenience. These roads are normally double lane, paved facilities or may be dust abated aggregate surfaced roads. The operational and objective maintenance level planned for roads in the Project Area is Level 2: This level is assigned to roads open for limited passage of traffic. Traffic is normally minor, usually consisting of one or a combination of administrative, permitted, dispersed recreation or other specialized uses. Log haul may occur at this level. Roads in this maintenance level are normally characterized as single lane facilities intended for use by high-clearance vehicles. Roads at this level are not subject to the Highway Safety act and passenger car traffic is not a consideration. The traffic management strategy for roads in the project area is to Accept high-clearance highway vehicles (such as pickup trucks) and to Discourage passenger vehicles after timber harvest.

Effects – Access Management

The effect to road access management that would occur as a result of implementing Alternatives 4 through 6 would include the expansion of the Wrangell Island road system, which would provide access to suitable timberlands. New road construction could mean an increase in access to the project area for hunters and recreationists, changing the type of hunting and recreation available in the Project Area. Hunting and other road-related disturbance could have an adverse impact on species sensitive to human disturbance. Although the project does not construct a loop road, new road construction could increase the likelihood that a connection would be made in the future. The following sections discuss how each alternative would affect these access components.

Alternative 1 (No Action)

Under Alternatives, current access patterns would continue as they are into the near future. Because the Forest Plan has assigned most of the Project Area to Scenic Viewshed, it can be assumed that harvest activities will occur in the Project Area at some time in the future. Until the time when harvest would occur, actual use of the Project Area would be expected to be similar to current use.

Alternative 2 and 3

Alternatives 2 and 3 do not construct any road. All timber would be yarded by helicopter to existing DNR roads in the project area. Except for Alternative 1, Alternative 2 and 3 have the least roads-related effects on wildlife, erosion, sedimentation, water quality, and scenery, but do not improve access for timber management, hunters, and recreationists in the Project Area. Because these alternatives do not build road, they decrease the likelihood that a loop road connection would be made in the project area some time in the future.

Alternatives 4, 5, and 6

Alternative 4 would construct the greatest amount of road, including 1.4 miles of permanent road and 1.2 miles of temporary road. Alternatives 5 and 6 would each construct 1.4 miles of permanent road. Alternative 4, followed by Alternatives 5 and 6 does the most to improve access for timber management,

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hunters, and recreationists, but would have the greatest roads-related effects on wildlife, erosion, sedimentation, water quality, and scenery. Alternatives 4-6 build the same 1.4 miles of permanent road, increasing the likelihood that a loop road connection would be made in the project area some time in the future.

Environment and Effects Upon Other Resources

Subsistence

Affected Environment – Subsistence

Section 810 of ANILCA requires a Federal agency, having jurisdiction over public lands in Alaska, to analyze the potential effects of proposed land-use activities on subsistence uses and needs. An ANILCA 810 analysis should include: an evaluation of the possibility of affects on subsistence uses; a distinct finding on whether the proposed action may significantly restrict subsistence uses; notices and hearings if the evaluation results in a finding that the proposed action may significantly restrict subsistence uses; and determinations if, following a public hearing where a finding of a significant restriction remains, the responsible official decides to proceed with the proposed project.

Evaluation criteria used to assess the effects of the proposed alternatives are: (1) changes in abundance or distribution of subsistence resources, (2) supply and demand, (3) changes in access to subsistence resources, and (4) changes in competition from non-subsistence users for those resources. The evaluation determines whether subsistence uses within the analysis area or portions of the area may be significantly restricted by any of the proposed action alternatives. To determine this, the evaluation: (1) considers the availability of resources used for subsistence in the surrounding areas; (2) considers the cumulative impacts of past and reasonably foreseeable future activities on subsistence users and resources; and (3) focuses on the mapped subsistence use areas by communities with documented subsistence use within the study area.

Wrangell is the community considered in our ANILCA 810 analysis due to the proximity of the Doughnut Project Area to town and current and traditional subsistence use. In a recent report by ADFG, Wrangell Island received the highest ranking possible for sensitivity to disturbance. Areas received high rankings if data suggested that resource development or other disturbance in that VCU would have a relatively greater adverse impact on subsistence users (ADFG 1998).

Abundance, Distribution and Demand for Deer

Deer are believed to be the most important subsistence resource that will be impacted by this sale.

Wrangell Island currently contains 89% of 1954 deer habitat capability. This is expected to reduce to 76% by the year 2095 under the selected Forest Plan alternative (Forest Plan 1997). Current habitat conditions with predators taken into account can support 3,913 deer or 23 deer/square mile although actual deer density is believed to be much less than this number. These numbers are higher than those listed in the Forest Plan due to the conservative approach that was used in the Forest Plan process. Habitat capability on the island is predicted to reduce to 15 deer/sq mile by 2095 (Forest Plan 1997).

The number of deer taken off of Wrangell Island is highly variable but currently a higher number of deer are harvested from other nearby islands. On average, 5-10% of the Wrangell resident annual deer harvest occurs on Wrangell Island (Forest Plan 1997). As an indication of lower deer numbers than predicted on Wrangell Island, a higher average number of deer are harvested from Etolin and Zarembo.

It is difficult to predict demand on Wrangell Island since historically a higher number of deer were harvested here than what is harvested today. Of Wrangell hunters (n=75) interviewed in 1958, 37% claimed to have hunted on Wrangell Island. Annually, 110-155 deer were harvested off of Wrangell Island during this time period, which equated to 17-18% of Wrangell resident's total deer harvest. (Doerr, pers. comm). ADFG hunter survey statistics estimate that forty-nine deer were harvested from Wrangell Island in 1998-1999 (ADFG 1999).

Do current harvest levels of deer on Wrangell Island (one rough measurement of demand) exceed what the island is currently capable of producing? The current average annual harvest for deer on Wrangell Island is 42 deer, which equates to 1.5% of current habitat capability (Forest Plan 1997). Based on deer hunter surveys, satisfying hunter demand on Wrangell Island requires a population of roughly 1,759 deer, which is nearly equivalent to the habitat capability within the old-growth reserves (ADFG 1995, Wrangell Island

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Analysis deer summary sheet). Therefore, it appears that current harvest levels on Wrangell Island can be maintained.

It is much more difficult to know what actual or future demand for deer will be and whether or not the island is capable of producing that many deer. Demand may be unlimited on islands with road systems that are connected to a community such as Wrangell and Petersburg, i.e. people prefer to harvest deer "out the road" versus leaving the island (J. Doerr, pers. comm.). In 1998-1999, ADFG estimates that there were 570 Wrangell hunters (covering all areas) for a total harvest of 625 deer (ADFG 1999).

The Forest Plan evaluated effects on subsistence for the community of Wrangell by comparing projected changes in deer availability to future demand in areas where 75% of Wrangell's deer harvest occurs. In no case did demand exceed 20% of habitat capability. Demand of all hunters (resident and nonresident) did exceed 10% of habitat capability by the year 2095; however, demand could be met for resident hunters. "This analysis may underestimate negative effects when deer populations are below carrying capacity" (Forest Plan, FEIS Vol. 2).

Abundance, Distribution and Demand for Moose

Moose are an important food resource for Wrangell residents. The most important and traditional area for moose hunting is the Stikine River. Wrangell residents occasionally take moose from other drainages, specifically; Aaron Creek, Crittenden Creek and Virginia Lake (Cohen 1989). Although there may be a change in the distribution of moose as a result of this project, we predict an insignificant change in their island-wide abundance. Moose will most likely be limited by the amount of forage (willow) on Wrangell Island and not the amount or distribution of winter cover. Most likely, Wrangell residents will continue to depend on the Stikine River as a place to harvest moose.

Abundance, Distribution and Demand for Other Species

We expect an insignificant change in the island - wide abundance of any other subsistence species as a result of this project. Furbearers make up an insignificant percentage of total subsistence harvest. Current furbearer trapping is believed to be for commercial rather than subsistence purposes. Mountain goats do not occur on Wrangell Island and will not be impacted by this project. Vancouver Canada Geese have been observed in the area. However, the Project Area is not an important area for Wrangell waterfowl hunters (Cohen 1989). Effects on abundance, access and competition for fish, shellfish, marine mammals or other foods are expected to be absent or minimal.

Black bear harvest on the north end of Wrangell ranks third in four categories of importance when compared to other areas in Southeast (ADFG 1998). Black bears should continue to use the study area after sale activities are completed if other food sources (berries, beach grass flats etc.), and sufficient old growth for cover are maintained. Although alternatives with roads may lead to more harvest of bears, we do not expect a significant change in abundance of bears as a result of this project.

Access

Road building can affect subsistence both positively and negatively by "providing access, dispersing hunting and fishing pressure, and creating the potential for increased competition" (Forest Plan 1997). Alternatives that do not build roads will have no effect on access. Alternatives that build roads will potentially increase the number of hunters in the area leading to a negative experience for those who wish to get away from "the crowds" and a positive experience for those who do not want to hike far to hunt.

Alternatives that build roads could lead to increased deer harvest due to ease of access. This in turn could lead to local decreases in deer abundance. Reductions in deer abundance may lead to the possibility of a significant restriction when considered along with past, present and foreseeable losses in deer winter range (see Cumulative Effects).

Competition

Competition between rural residents in this area may increase slightly, especially when those who currently hunt in the area must compete with new hunters using the road system. There may be less competition among those who currently hunt the road system since they will have an opportunity to disperse their use.

A substantial increase in competition for subsistence wildlife resources from non-rural community residents is not projected to result from the alternatives proposed. Nor is competition for those wildlife resources projected to increase in the foreseeable future due to activities proposed in this project. There are no known connections between an increase in non-resident wildlife harvest and land management activities.

Cumulative effects

Subsistence opportunities can change as a result of cumulative effects of past and future activities. Eighteen MMBF of timber will be removed from Wrangell Island in the next ten years, which could negatively impact old-growth dependent wildlife species. Avoiding harvest within the old growth reserves and corridors identified as part of the Wrangell Island Analysis will benefit wildlife and lessen these impacts (WIA 1997). The beach, stream and estuary fringe are key habitats for many subsistence wildlife species and will also help buffer the harvesting impacts.

The Forest Plan states that "...implementation of any alternative [Forest Plan alternatives] could be accompanied by a significant possibility of a significant restriction on the abundance and/or distribution of subsistence uses of deer". Each timber sale by itself may not lead to the possibility of a significant restriction but the cumulative effect of sales on Wrangell, Zarembo, Etolin and Woronkofski may lead to an effect. Each timber sale on Wrangell Island must be considered in this context.

It is likely that Wrangell residents would prefer to harvest more deer close to home, which adds additional weight to the importance of the deer population on Wrangell Island, which is currently low. The State has and continues to harvest important beach fringe habitat within the project area. Small wildlife populations cannot recover as easily from perturbations to critical habitat or from the loss of individuals. Therefore, any activities that reduce the value of existing deer winter range or increase the efficiency of predators such as wolves has the potential to negatively impact the existing deer population.

Effects –Subsistence Findings

This analysis leads to the conclusion that there may be the significant possibility of a significant restriction on subsistence use of deer on Wrangell Island due to cumulative effects. Deer abundance is low on Wrangell Island and loss of any wintering habitat and increased access may lead to further population declines. Beach habitat or old growth forest below 500 feet is believed to be critical for deer during harsh winters. The State has and continues to harvest these areas within the project area. Although many Wrangell hunters hunt off of the island it is believed that many would harvest more deer from Wrangell if the population were higher. The analysis of the effects of competition for subsistence resources do not support a finding of "may significantly restrict". The analysis did not result in a finding of significant impact on subsistence use of other wildlife, fish and shellfish, marine mammals, other foods, and timber resources.

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Soils

Affected Environment - Soils

The Forest Plan directs us to plan land use activities to “avoid irreversible or serious and adverse effects on soil resources”. The primary concerns are with slope stability and surface erosion. Harvest units and roads were planned to minimize the potential soil disturbance.

Harvest units and roads were located to avoid oversteepened and unstable hill slopes. The CLU database as modified with field information was used as a basis for mapping oversteepened slopes. Some areas with slopes greater than 72% are included in harvest units. In unit 17, the west corner of the unit has 80-90% slopes with pitches up to 120%. Soils are shallow and well drained; bedrock is metasedimentary rock with granitic intrusions (one small out crop encountered on steep section). Water is diverted off the slope by a small bench, which routes the water to the east. Slopes are moderately dissected. Harvest on these slopes is not expected to substantially increase the risk of mass wasting. The back line of the cable unit will be laid out to avoid the 120% slope.

Unit 23 has areas with slopes steeper than 72%. Approximately 5 acres in the north central part of the unit has slopes of 70-85%. The steepest slopes were found up the valley adjacent to an incised Class 3 stream southwest of the unit. The soils are somewhat poorly drained, the parent material is glacial till over metasedimentary bedrock. Vegetation in this area is hemlock/yellow cedar with oak fern/deer fern understory, with some blueberry. Helicopter harvest with scattered retention will reduce the risk of mass wasting. Unit layout should avoid steep slopes at north end of the unit.

Field reconnaissance of unit 24 was not completed. The north and west side of the units have slopes >72%. Some areas may be excluded during layout. Partial harvest retaining 50 to 70% of the stand will retain some rooting strength.

Suspension of logs reduces the amount of soil disturbance and potential erosion. Partial suspension of logs will be achieved in most of the cable settings. No areas were identified as needing full suspension. During the course of logging if excessive disturbance is likely to occur, the timber sale administrator may request additional protection measures.

Effects – Soils

Construction of spur roads is expected to be the primary factor resulting in loss of productive forestlands. A 4.8-acre disturbance per mile of road is used to calculate the area of disturbance, based on a 40-foot average clearing width. For logging disturbance, approximately 1/10 acre per 100 acres of cable logging is expected. Soil disturbance to areas over 100 square feet is usually considered detrimental. No soil disturbance is expected from helicopter yarding.

Table Soils-1 Potential Amount of Detrimental Soil Disturbance for each Alternative (acres).

Factor	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6
Spur Roads	0 ac.	0 ac.	0 ac.	5.76 ac.	0 ac.	0 ac.
Logging	0 ac.	0 ac.	0 ac.	0.91 ac.	0.41 ac.	0.37 ac.
Disturbance	0 ac.	0 ac.	0 ac.	6.67 ac.	0.41 ac.	0.37 ac.

Fisheries, Watershed, and Marine Habitats

The Doughnut Project Area is located on the northeast side of Wrangell Island, on slopes facing the Eastern Passage (or “Back Channel”). Much of the project area consists of small, relatively steep first- and second-order coastal watersheds. The exceptions are two third-order watersheds known locally as Hermit Creek and Mom’s Creek. Most of the Project Area streams contain near-shore reaches of resident or anadromous fish habitat; several streams provide domestic water supply for private landowners. By law, we must maintain these uses, protect riparian habitat, and prevent detrimental changes in water temperature, water chemistry, stream channel stability, and sediment loads that could adversely affect these uses (18 AAC 70, 1999).

During the initial planning stages, we became concerned about *cumulative watershed effects in Hermit Creek*. The Hermit Creek watershed has a relatively high level of timber harvest, roads, and landslides when compared to other Wrangell Island watersheds (USDA Forest Service, 1998). *Watershed cumulative effects* was eliminated as a key issue after all new roads and most of the timber harvest proposed in the Hermit Creek watershed were dropped from further consideration from all alternatives of the Doughnut Timber Sale. Nevertheless, due to the likelihood of drainage structure replacement in Hermit Creek and timber haul on existing roads through the Hermit Creek and Pat Creek watersheds; we examine the issue within the Watershed section of this report.

Affected Environment - Marine Water

We will consider the marine waters in Zimovia Strait adjacent to the Pat Log Transfer Facility (LTF) as the affected environment. Marine waters of the Eastern Passage are separated from the proposed timber sale area by a band of state and private lands. We don’t anticipate any effects on marine waters of the Eastern Passage as a result of this project. All action alternatives for the Doughnut project may result in the use of Pat LTF, which is currently permitted. If the Doughnut timber is awarded to a Wrangell purchaser, it is unlikely that the LTF would be used. However, if the timber is awarded to an off-island purchaser, this is the LTF that will be used to transfer logs to water for rafting or barging to another processing location.

The near-shore waters of Zimovia Strait in the vicinity of the Pat LTF provide fishing grounds for a variety of commercial and personal use species including salmon, shrimp, and crab. The extensive mud flat associated with Pat Creek, about ½ mile south of the LTF, provides a popular area for personal use clamming.

The Pat LTF was originally constructed as a log crib bulkhead in the 1960s and reconstructed to its present configuration as a concrete panel-faced bulkhead in 1986. In 1996 a pollution prevention plan was implemented at the site, including storm water treatment and sediment detention features. This facility has processed approximately 127 MMBF of timber.

The permits for Pat LTF do not require monitoring for bark deposition. Nevertheless, a SCUBA dive survey was conducted in 1997 to determine if there was a concern for bark deposition there (USDA Forest Service, 1997a). The five transects covered an area of approximately 1.2 acres. Bark depths recorded ranged from 0 - 8 cm. An area of about 0.6 acres was covered with bark at least 1 cm deep. The dive results indicate that bark deposition at the Pat LTF meets state water quality criteria for other LTF permits: bark depth was less than 10 cm at any point, and there was no zone of deposition exceeding 10 cm depth. The surveyors also observed a few log piles and other submerged debris (a washing machine, an outboard motor) on the ocean floor adjacent to the LTF. No information is available on the marine flora or fauna in the vicinity of the LTF. The biological productivity and diversity of this area is unknown.

Environmental Consequences - Marine Water

The accumulation of bark and other woody debris on the ocean floor associated with the transfer and storage of logs can impact marine habitats by smothering organisms or creating unfavorable chemical conditions. Although the dive results may indicate that there is sufficient tidal flushing at this site to minimize concerns for these impacts, they are the most likely impacts of the Doughnut Timber Sale on marine waters. Tideland fills at LTFs can destroy marine habitats and displace organisms. However, no alternative proposes to enlarge the tideland fill at Pat LTF. Recent site inspections of the sediment

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detention features during heavy rainfall indicate that they are effective in preventing sediment transport into marine waters.

All action alternatives have potential to impact marine habitat during rafting and other activities at the Pat LTF if it is used to transfer logs to marine waters. All alternatives will employ mitigation measures such as slow-velocity log entry and inspections to ensure marine impacts are minimized. Alternatives producing the most volume will have the most potential for increasing bark and woody debris deposition. Therefore, Alternatives 5 and 3 would have the most effect, followed by Alternatives 6 and 2, with Alternative 4 having the least effect of all the action alternatives.

Affected Environment - Fresh Water Fisheries

In preparation for planning the Doughnut Timber Sale, Forest Service personnel conducted fisheries reconnaissance by foot in 1998 and 1999 (Thompson, 2000). This survey used visual observations, electrofishing, and minnow trapping. Typically, fish crews walked streams from the shoreline to the upstream limit of verified fish or beyond. The fisheries crew collected stream gradient, width, incision depth, and substrate data during their survey in order to classify streams by Tongass National Forest habitat management classes and physical process groups or channel types. The habitat management (or fish stream value) classes are defined as follows (Forest Plan page 4-8):

Class I: Streams and lakes with anadromous or adfluvial fish habitat;...or habitat above fish migration barriers known to be reasonable enhancement opportunities for anadromous fish.

Class II: Streams and lakes with resident fish populations and generally steep (6-15 percent) gradient (can also include streams from 0-6 percent gradient) where no anadromous fish occur, and otherwise not meeting Class I criteria. These populations have limited fisheries values and generally occur upstream of migration barriers or have other habitat features that preclude anadromous fish use.

Class III: Perennial and intermittent streams with no fish populations but which have sufficient flow, or transport sufficient sediment and debris, to have an immediate influence on downstream water quality or fish habitat capability. These streams generally have bank full widths greater than 5 feet and are highly incised into the surrounding hill slope.

Class IV: Other intermittent, ephemeral, and small perennial channels with insufficient flow or sediment transport capabilities to have an immediate influence on downstream water quality or fish habitat capability. These streams generally are shallowly incised into the surrounding hill slope.

Non-streams: Rills and other watercourses, generally intermittent and less than 1 foot in bank full width, little or no incision into the surrounding hill slope, and with little or no evidence of scour.

Except for the uppermost reach of a small Hermit Creek tributary, all fish populations found in these streams are within state and private lands. Table FISH-1 displays the findings of the 1998 and 1999 surveys. Figure Water-1 displays the stream locations.

Table FISH-1. Fish species verified in streams with the Doughnut Project Area.

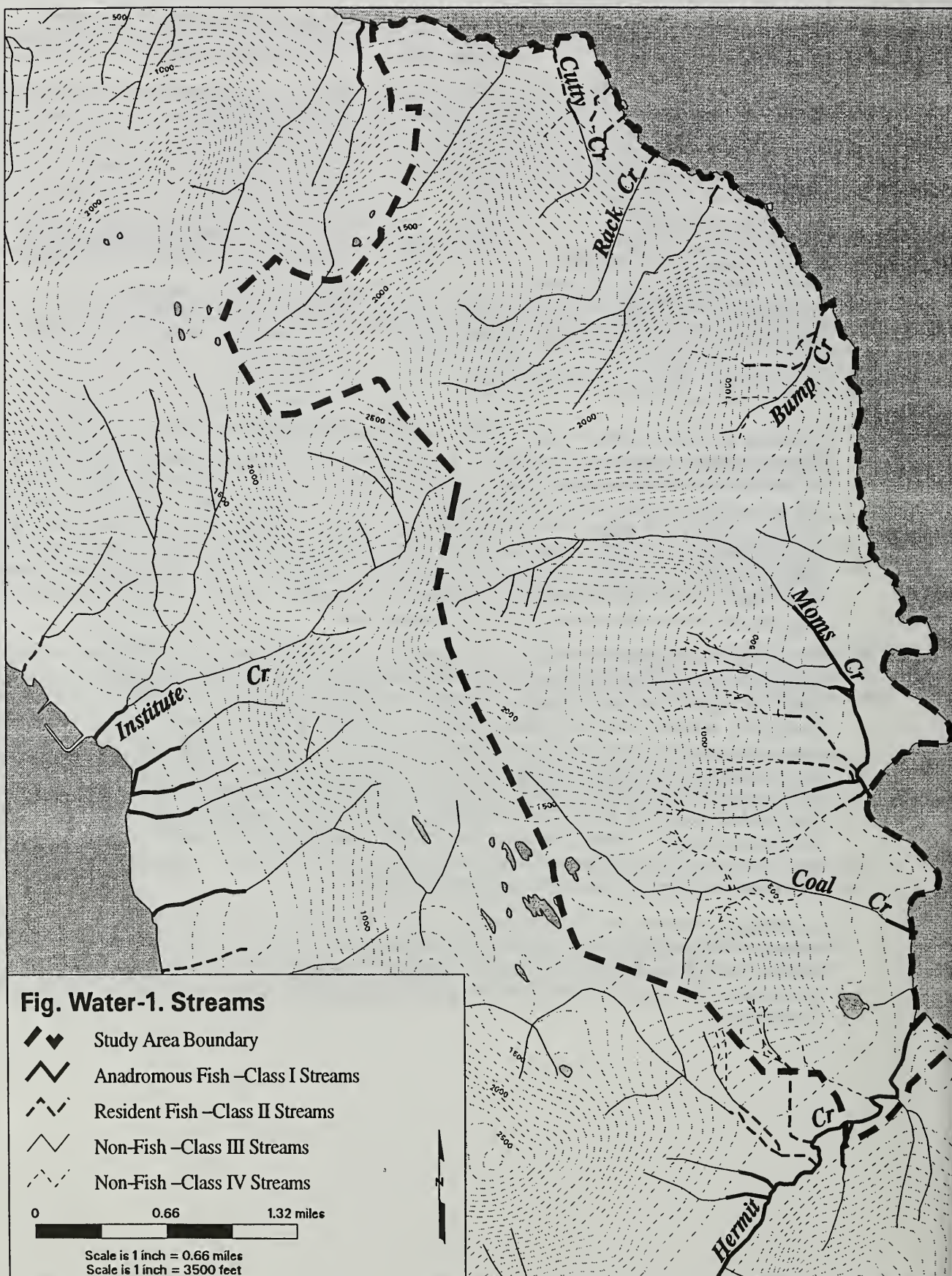
Local Name	ADFG #	Survey Notes Name	Fish Species Verified
Cutty Creek	None	ND3	Cutthroat Trout
Unnamed	None	ND4	Cutthroat Trout
Unnamed	None	ND5	Cutthroat Trout
Rack Creek	None	ND6	Cutthroat Trout
Unnamed	None	ND7	Cutthroat Trout
Bump Creek	None	ND8	Cutthroat Trout, Dolly Varden Char
Mom's Creek	107-40-10910	Mom's Creek	Coho Salmon, Cutthroat Trout, Dolly Varden Char
Coal Creek	None	None	Coho Salmon, Cutthroat Trout
Hermit Creek	107-40-10880	Hermit Creek	Coho Salmon, Cutthroat Trout, Dolly Varden Char

Spawning and rearing habitat in most of these streams is poor due to the small size of the watersheds, steep stream gradients, large stream substrate, and lack of deep pools. The lower reaches of Mom's Creek contain the best quality riparian and fish habitats in the Project Area: the main stem and several tributaries exhibit low or moderate gradient meandering channels with floodplain features (debris jams, gravel bars, side channels, large spruce trees). Hermit Creek also contains high quality fish habitat. There are two barriers to anadromous fish passage near the mouth of Hermit Creek; the lowest is about ¼ mile upstream from salt water. Stream reaches up and downstream of the barrier exhibit high quality riparian and fish habitats. The main stem of Hermit Creek upstream of the Project Area boundary contains good rearing habitat for resident fish and provides recreational fishing opportunities.

The stream process group and channel type classification (USDA Forest Service, 1992) reflects physical differences in stream channels and processes and provides the basis for delineating riparian management areas or no-harvest buffers required by the Forest Plan. The most important and sensitive process groups (floodplain, estuarine, and palustrine streams) are very limited in the project area. Throughout the Tongass National Forest these low gradient streams generally contain the highest quality fish habitat and are the most sensitive to sediment deposition. Moderate gradient mixed control (MM), and alluvial fan (AF) streams are also limited within the project area. These streams are slightly steeper and alternately receive and transport sediment. By far, most within the Doughnut project area fall into the high gradient contained (HC) process group. These streams are generally headwater streams with limited fish habitat (Class II, if any) and function as conduits of sediment and debris to downstream reaches, or in the case of many watersheds in the project area, directly to marine waters.

In summary, anadromous and resident fish productivity is relatively low in the Doughnut Timber Sale area streams. Except for one small Hermit Creek tributary, there are no fish-bearing streams within the national forest portion of the project area. Streams with highest habitat values are very limited in the project area. The most important fish-bearing streams (and riparian areas) include Mom's Creek and Hermit Creek.

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Environmental Consequences - Fresh Water Fisheries

When compared to timber sales planned in the immediate vicinity of fish streams or in watersheds with more productive fisheries, the risks of direct and indirect impacts to fisheries associated with timber harvest and road construction are relatively low in the Doughnut Timber Sale area. The only direct effect will be replacement of two drainage structures proposed in all action alternatives. The Hermit Creek crossing is a log stringer bridge, which constricts high flows and is poorly suited for long-term use. A nearby culvert crossing a Hermit Creek tributary does not appear to provide fish passage. The effects associated with structure replacement will be temporary and short-term increases in sediment resulting from stream channel disturbance, with the long-term result of more stable drainage structures which provide fish passage. Site-specific information is shown in the road card.

Other than these existing road crossings, no alternatives will have direct impacts upon fisheries. No new roads will cross fish streams and no harvest units are adjacent to fish streams. Indirect and potential cumulative impacts to fisheries are addressed in the Watershed section.

The State has proposed road and harvest plans down slope of the Doughnut timber sale that may include road-fish stream crossings and timber harvest adjacent to resident fish streams. Specifically, Bump Creek and Mom's Creek fisheries could be directly impacted by these activities, since state forest practices for both road construction and timber harvest do not require protection measures for most resident fish streams. These effects could occur regardless of the Doughnut Timber Sale alternative selected, and may include fish migration barriers at road-stream crossings, riparian harvest, and stream channel disturbance associated with riparian harvest.

Essential Fish Habitat

The Magnuson-Stevens Fishery Conservation and Management Act of 1996 requires consultation with the National Marine Fisheries Service on activities which may effect Essential Fish Habitat, defined as "those waters and substrates necessary to fish for spawning, breeding, feeding, or growth to maturity." The Act promotes the protection of these habitats through review, assessment, and mitigation of activities, which may adversely affect these habitats. This EA satisfies the consultation requirements by providing a description and assessment of Essential Fish Habitat in the project area, a description of the Doughnut project and its potential impacts on these habitats, and a description of the mitigation measures that will be implemented to protect these habitats.

Essential Fish Habitat includes all freshwater streams accessible to anadromous fish, marine waters, and intertidal habitats. For the Doughnut project this would include the low reaches of Hermit Creek, Coal Creek, and Mom's Creek, and the marine waters and intertidal habitats at the Pat LTF.

The Doughnut project is unlikely to adversely affect Essential Fish Habitat for the following reasons: 1) there is very little Essential Fish Habitat in the project area, 2) proposed road construction and reconstruction crosses no Essential Fish Habitat; 3) there are no harvest units adjacent to Essential Fish Habitat, and all harvest units employ no-harvest buffers according to Forest Plan standards and guidelines; 4) monitoring data indicates there is probably sufficient tidal flushing to minimize bark accumulation in the marine waters and intertidal habitats adjacent to the Pat LTF. The Best Management Practices described in unit and road cards (Appendices A and B) provide assurance of water quality and aquatic habitat protection for all freshwater stream affected by the project.

Affected Environment - Watersheds

The north half of the project area is characterized by watersheds less than one square mile in size. The three main watersheds (Mom's Creek, Coal Creek, and Hermit Creek) in the south half of the project area are larger (2.6, 1.2, 7.3 square miles, respectively). The small size of all these watersheds (except Hermit Creek) limits the application of some analytical tools that we usually use to characterize watershed conditions and processes. Nevertheless, using data from our Geographical Information System (GIS), together with field knowledge of the area, we can say the following about the watersheds in the Doughnut project area:

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The steep nature of most of the watersheds, in combination with relatively steep and dense stream networks result in rapid and efficient transport of sediment downstream with little opportunity for long term sediment storage within the stream network.

Headwater wetlands are probably important sources of stream flow (especially during dry periods) and help sustain the fisheries and domestic water supplies in these small watersheds.

The existing and future use of project area streams as domestic water supplies is an important consideration in protecting water quality.

The stream network on the ground is larger than shown in Figure Water -1. In some areas, Class III and IV stream mapping will be further refined during unit layout to ensure that riparian management areas are correctly identified and protected. We expect to find more Class IV streams during unit layout and have found that it is more efficient to map them at this time, rather than devote the amount of time and personnel required to map all Class IV streams in a project area prior to unit layout. Based on the definition of Class IV streams (above), their presence in the project area will not influence our analysis or comparison of alternatives. Individual unit cards (Appendix A) contain more detail on this issue.

A Tier 1 watershed analysis was conducted on Wrangell Island (USDA Forest Service, 1998) using low resolution (primarily GIS-based) data following the process outlined in the July 1997 Draft Watershed Analysis Handbook for the Alaska Region (USDA Forest Service, 1997b). This coarse assessment showed that Mom's Creek (called "State" Creek in the Wrangell Island Analysis Report) ranked highest for sediment sensitivity of all nineteen third-order watersheds on Wrangell Island. This high inherent sensitivity is a result of the combination of steep terrain and efficient drainage network upstream of relatively low gradient stream reaches in a very small watershed. Field examination of Mom's Creek verifies that this stream has very high energy, even in its lower reaches, which contain numerous debris jams and evidence of a frequently mobilized bed load of large cobbles. Fieldwork throughout the project area indicates these conditions are typical of most of the other watersheds in the Doughnut project area. Except for the presence of anadromous fish at its mouth, Mom's Creek does not stand out in the project area as more or less inherently sensitive than any other watershed (Thompson, 2000).

The same Tier 1 watershed analysis ranked Hermit Creek as fifth of nineteen third-order watersheds for inherent sensitivity to sediment impacts. In addition to its inherent sensitivity, Hermit Creek ranks sixth highest for road density (1.3 miles/square mile). It also ranks third highest for cumulative watershed harvest on the island. Sixteen percent of the watershed has been harvested within the last thirty years. Pat Creek was ranked as sixth for inherent sensitivity to sediment impacts. About sixteen percent of the Pat Creek watershed has been harvested; its road density is at least 1.2 miles/square mile (not including recent road construction on state lands). Landslides, riparian timber harvest, high-risk stream crossings, perched culverts in fish streams, recreational fishing values, and future state harvest plans are all other factors that lead to concerns for cumulative effects in the Hermit and Pat Creek watersheds.

An analysis of streambed particle size distributions in both Mom's and Hermit Creeks indicates that fine sediments in fish spawning areas are well within the range of fine sediments found in similar un-managed streams throughout the Tongass National Forest. Both streams contained less than a 20% component of fine sediments 8 mm or less in diameter (Thompson, 2000).

Environmental Consequences - Watersheds

We can compare alternatives by calculating the amount of road construction and timber harvest in each alternative. Because of the ground-disturbance, bare soil, and stream-channel alterations associated with road construction, roaded alternatives are likely to have greater impacts than unroaded alternatives. Table WATER-1 compares road construction across alternatives.

Table WATER-1

	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6
Specified and Temporary Road Constructed (miles)	0	0	2.6	1.4	1.4

Alternatives 2 and 3 clearly stand out as having less risk for direct impacts to stream channels, downstream sediment transport, and downstream fisheries since they do not construct roads. In addition, these alternatives may result in less indirect impacts associated with completion of the “Back Channel Loop Road” on state lands, which will require additional stream crossings.

Alternatives 5 and 6 propose slightly less road construction than Alternative 4, so they would have slightly less risks of direct impacts than Alternative 4.

Two assumptions underlie our comparison of impacts associated with timber harvesting in each alternative:

Helicopter harvest systems result in less ground disturbance than cable harvest systems. Therefore, helicopter harvest results in less erosion and sedimentation, and fewer environmental consequences than cable harvest.

When implemented by helicopter yarding, harvest prescriptions of individual or group selection, or small patch cuts which retain a high percentage (70% or more) of trees result in less ground disturbance, and less disruption of hydrologic processes (interception, infiltration, etc.) than clearcutting or overstory removal which harvest a high percentage of trees in a stand. Therefore, high retention harvest results in less erosion and sedimentation, less risk of changes in stream flow regimes, and fewer environmental consequences than low retention harvest prescriptions. We lack sufficient information to determine a precise retention threshold for watershed impacts. In actuality, there may be little difference between 50% retention and 70% retention. For this project, we have proposed 70% retention as a threshold in order to present a worst-case scenario, which favors a conservative approach to managing these watersheds.

Table WATER-2 displays a comparison of cable, helicopter, and harvest retention by alternative. The acres shown represent total unit acres and have not been adjusted for proportion of retention or exclusions within units.

Table WATER-2

	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6
Total Harvest (acres)	464	464	91	464	378
Cable (acres)	0	0	91	41	41
Helicopter (acres)	464	464	0	398	312
Retention at least 70% (acres)	454	55	0	55	249
Retention less than 70% (acres)	10	409	91	409	129

Alternatives 2, 3, and 5 propose similar amounts of harvest. However, Alternative 2 would have less impact than Alternatives 3 and 5 due to its use of high retention harvest prescriptions. Alternatives 2 and 3 would have less risk than Alternative 5 due to their reliance on helicopter instead of cable yarding. Alternative 4 proposes the least amount of harvest, and though it involves all cable and all clearcut (or low retention levels), the units are relatively small and do not contain Class III streams. Alternative 6 would rank somewhere between Alternatives 2 and 3, leading to a ranking of most risk to least risk: Alternatives 5, 3, 6, 2, and 4, when evaluated by timber harvest impacts alone.

In order to evaluate cumulative watershed effects resulting from National Forest and State land harvest, we evaluated the potential for individual watersheds to exceed 20% cumulative harvest, a threshold considered likely to trigger alterations in stream flow regimes. The risks associated with exceeding this threshold may include changes in stream flow regime: streams could become flashier (more flood-prone), resulting in channel erosion (Harr, 1986). Studies in Southeast Alaska and the Pacific Northwest have shown that timber harvest may result in either higher or lower levels of stream flow during dry periods (Bartos, 1990,

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Hicks, et al, 1991). Higher levels of stream flow during dry periods could be beneficial to both fish and water supplies, while lower levels of stream flow during dry periods could limit fish migration, reduce pool depth, increase stream temperature, and reduce water availability to homes. For this analysis, we again take a worst-case scenario approach by assuming that State land harvest will consist of clearcuts with no retention of all commercial forest.

Table WATER-3. Cumulative Watershed Harvest (less than 70% retention).

	Cutty Creek	Rack Creek	Bump Creek	Mom's Creek	Coal Creek	Hermit Creek
Alt 2	17%	15%	38%	5%	6%	16%
Alt 3	36%	34%	57%	13%	6%	16%
Alt 4	17%	19%	39%	8%	5%	16%
Alt 5	36%	34%	57%	13%	6%	16%
Alt 6	17%	22%	38%	9%	6%	16%

Table WATER-3 shows that cumulative harvest levels may exceed 20% in the Cutty, Rack, and Bump Creek watersheds under Alternatives 3 and 5. In Bump Creek, planned State harvest alone is likely to exceed the threshold. Although Alternative 6 results in cumulative watershed harvest exceeding 20% in both Rack and Bump Creeks, it drops units in Bump Creek and focuses high retention harvest prescriptions in these watersheds, so it is less likely to result in hydrologic changes. It is important to note that this would not trigger the need for more intensive watershed analysis under the Forest Plan, primarily because these are small first- and second-order (not large third-order) watersheds. This information is presented to provide an understanding of the risks associated with a relatively large proportion of low-retention (or even clearcut) harvest in these small watersheds. Given the potential damaging effects of channel erosion associated with higher peak flows, and the uncertainty of effects associated with changes in low flows, we assume that alternatives with the least likelihood of changing stream flow regimes are best, from a watershed perspective. Alternative 2 is the least likely to result in cumulative effects, followed by Alternatives 4 and 6. Alternatives 5 and 3 may result in cumulative effects and changes in stream flow regimes.

All alternatives may result in timber haul on existing roads through Hermit Creek and Pat Creek watersheds. Heavy truck traffic on these roads is likely to increase sediment transport, particularly at stream crossings and locations where the road is immediately adjacent to the stream in both watersheds. Recent aggregate surfacing of the road through much of Pat Creek watershed has reduced the amount of fine materials in the road surface, at least temporarily, which may serve to reduce the risk of sediment transport from the road surface. Due to the concern for cumulative effects in these watersheds, turbidity monitoring at specific sites is recommended to provide assurance of compliance with state water quality standards (see Appendix D).

Turbidity monitoring results on Wrangell Island (Thompson, 1999) indicate that State water quality standards may be achieved during road construction and that turbidity monitoring may be a useful tool for compliance monitoring and revising site-specific BMPs.

In summary, Alternative 2 is likely to have the least risk of direct, indirect, and cumulative watershed and fisheries impacts due to the fact that it constructs no roads and employs a high retention harvest prescription. Alternatives 3, 4 and 6 follow, although their comparison is slightly more complex: Alternative 3 is less likely to have direct effects on sediment transport because it constructs no road. However, Alternative 3 may lead to a high proportion of second growth in small watersheds, leading to risk of altered stream flow regimes and the resulting impacts on fisheries and water supplies. Therefore, Alternatives 4 and 6 are favored over Alternative 3, because they have less risk of these cumulative effects. Alternative 5 has the highest likelihood of direct, indirect, and cumulative watershed and fisheries effects because it constructs roads and proposes the most "low-retention" harvest.

All alternatives may result in increased sedimentation into Hermit Creek as a result of timber haul and drainage structure replacement and increased sedimentation into Pat Creek as a result of timber haul. We anticipate that standard road maintenance practices will minimize sedimentation, but we recommend turbidity monitoring as a tool to ensure these practices are effective.

All alternatives employ site-specific application of BMPs such as stream buffers and stream protection during harvest to minimize erosion and sedimentation. It will be especially important to ensure that timber sale administration staff, the timber sale purchaser and employees are aware of the downstream domestic water supplies, to avoid entry of potential pollutants into these streams. All mitigation measures equal or exceed the Alaska Forest Resources and Practices Regulations (11 AAC 95, 1993). The unit and road cards display additional site-specific information on BMPs.

Wetlands

Affected Environment - Wetlands

Wetlands are located on low gradient landforms from sea level to upper elevations in the Doughnut project area and on the adjacent State land. Various laws, initiatives, and Executive Orders require protection of wetlands. The President's 1993 Wetlands Plan was the formal adoption of an interim goal of no overall net loss of the nation's remaining wetlands, and the long-term goal of increasing the quality and quantity of the nation's wetland resource base. The Army of Corps of Engineers is responsible for regulation of dredge and fill in waters and wetlands through a permitting process. This project meets the criteria listed in 33 CFR 323.4(a)(6) for exemption from the permitting process.

Wetlands are defined as "areas that are inundated or saturated by surface or groundwater with a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted to life in saturated soil conditions" (40 CFR 230.41 (a)(1)). Wetlands are described by the type of vegetation they support for the purpose of discussion in this document. The CLU (common land unit) spatial database was the primary means of assessing wetland location and type. NWI (National Wetland Inventory) maps were examined and compared with CLU wetlands. The wetland types found in the Donut project area are forested wetland, muskeg, upland forest/muskeg complex, forested wetland/muskeg complex, and tall sedge fens.

Forested Wetland

Low volume hemlock and yellow cedar forests occupy the Forested wetlands in the project area. Tree cover ranges from a minimum of 10 percent to about 60 percent canopy cover. A lower canopy cover allows more sunlight to reach the understory creating a dense shrub understory. Canopy height is at least 25 feet. Plant associations (Pawuk and Kissinger, 1989) are primarily Mixed Conifer/Blueberry/Skunk Cabbage, Mixed Conifer/Blueberry/Deer Cabbage, Western Hemlock/Blueberry/Skunk Cabbage, Shore pine/Blueberry, and some Mountain Hemlock/Blueberry/Skunk Cabbage. Forested wetlands typically have peat over mineral soils. There are 236 acres of this wetland type in the project area.

Forested Wetland/Muskeg Complex

These wetlands are a complex of forested wetlands as described above, and muskegs as described below. Approximately 459 acres of this wetland type occurs in the project area.

Upland forest/Muskeg complex

These wetlands are a complex of upland forests interspersed with muskeg. Forested wetlands are usually found as an ecotone between the upland forest and the muskeg. Three acres are mapped in the project area.

Muskeg

Muskegs represent all non-forested wetland types except the tall sedge fens. Short sedges, rushes and forbs are common plants found growing in association with a numerous Sphagnum species, and other mosses. Muskegs have deep peat soils, which have developed from the gradual accumulation of plant material overtime. Tree cover is less than 10 percent, consisting mainly of stunted lodgepole pine with lesser amounts of western hemlock, mountain hemlock, and Alaska yellow-cedar. Common shrubs include

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juniper, Labrador tea, crowberry, mountain cranberry, dwarf blueberry, bog laurel, and bog cranberry. These wetlands function as areas for recharge of groundwater and streams, as deposition and storage of sediment and nutrients from upslope sources. There are approximately 179 acres of this wetland habitat in the area.

Tall Sedge Wetlands

Tall sedge wetlands are open (non-forest) fens. Unlike muskegs, or bogs, shore pine are usually not present in fens. Oregon crab apple and highbush cranberry are common on the margins of fens; forb diversity is relatively high in these wetlands. Soil and water in a fen is less acidic and has a higher nutrient content than muskegs. Tall sedge wetlands usually occur adjacent to streams, or on the fringe of muskegs where they receive nutrient enrichment from upslope runoff. Ten acres of this wetland type are mapped in the State Creek drainage.

Environmental Consequences - Wetlands

Road construction on wetlands will result in a loss of total wetland acres. Action alternatives propose to construct 0 to 2.6 miles of road for the Donut timber sale. Additional roads may be constructed in the area by the State and/or the City of Wrangell. Wetlands-1 displays the miles of road that would be constructed across wetlands and the acreage that would be affected. Wetland types affected are the forested wetland and the forest/muskeg complex.

Direct impacts upon wetlands are expected from road construction in Alternatives 4, 5 and 6. A 25-foot wide road width was used to calculate affected area. Additional habitat loss may occur in open wetlands adjacent to the road due to traffic disturbance. Road construction across wetlands is expected to be standard overlay construction with shot rock, without ditching having a 14-foot running surface. Additional effects may include rock pit development, safety pullouts, and landings for helicopter units. The road card discusses road location and specific measures that will be used to minimize impacts on wetlands.

Wetlands-1. Road Construction (on State and Federal lands) on Wetlands

Alternative	Total Proposed Miles	Affected Wetland Acres
Alternative 1	0 mi.	0 ac.
Alternative 2	0 mi.	0 ac.
Alternative 3	0 mi.	0 ac.
Alternative 4	1.6 mi.	4.7 ac.
Alternative 5	1.1 mi.	3.3 ac.
Alternative 6	1.1 mi.	3.3 ac.

Cumulative Effects - Wetlands

Additional road may be constructed by the State and/or the City of Wrangell. This will likely impact more wetlands, though the amount of wetlands likely to be affected by road construction is expected to be small relative to the total acreage of wetlands in the Project Area.

Recreation

The Doughnut Project Area is located along the eastern shore of North Wrangell Island. Recreation use of the project area is relatively low. The main recreation characteristic of the area is the scenery resource (discussed under Issue 1, Scenery). The area is located along Eastern Passage of Alaska's Inside Passage and is viewed mostly by independent boaters, those traveling with outfitter/guides, and residents and property owners of Wrangell Island/East subdivision (State of Alaska). Eastern Passage is occasionally used as a secondary route between Wrangell and Ketchikan by small cruise ships and Alaska Marine Highway ferries. Commercial and sport fishermen frequent the waters near the project area. Land based activities likely to occur include hunting and hiking. In the winter, snowmobilers use the southern portion of the project area to access high country on North Wrangell Island. The following discussion describes the existing condition of the area in terms of Inventoried Roadless Areas, Recreation Opportunity Spectrum (ROS), and Inventoried Recreation Places. The Environmental Consequences sections describe the anticipated effects to recreation resources from alternatives proposed in the Doughnut environmental analysis.

Affected Environment – Roadless Areas

North Wrangell Roadless Areas # 227

The entire Doughnut Project Area is within the North Wrangell Roadless Area #227, described in Appendix C of the Forest Plan. This roadless area contains a total of 7,597 acres. Roadless Area #227 is bounded to the north and east by State owned lands. The State owned lands are currently roaded, with some existing harvest units. The State is planning additional roading and harvest in the future. The Tyee Power line bounds the Roadless Area to the south. The lands to the west and northwest of the North Wrangell Roadless Area are owned by the State, City of Wrangell, and private entities. These lands are heavily developed with residences and roads.

The area's Wilderness potential has been reduced due to impacts upon natural integrity by roads, timber harvest, and the power line surrounding it. There is a good opportunity for solitude within the area, especially after one has gone a short distance from the roads, with the area generally providing for semi-primitive recreation opportunities.

The North Wrangell Roadless Area is described in Appendix C (pp C-48-49) of the Forest Plan.

Environmental Consequences – Roadless Areas

North Wrangell Inventoried Roadless Area (#227)

Forest Service Handbook guidance indicates that unroaded areas may qualify for Roadless Area inventory, even though they include timber harvest areas, so long as logging is not evident (FSH 1909.12). In determining effects to scenery, we conclude that harvest units with greater than or equal to 60% retention would meet the Retention Visual Quality Objective (VQO) because they would not be noticeable to the casual observer. We based our roadless analysis on the assumption that units with partial cuts (greater than or equal to 60% retention) would not be evident, and would not affect the acreage of Roadless Area #227.

Evident harvest units and roads affect the suitability of a Roadless Area. In those alternatives where evident harvest units exist, or roads either crossed onto Forest System lands or came very close to the State/National Forest Boundary, we used Forest Plan mapping criteria to determine how many acres would no longer be suitable for Roadless Area inventory. Criteria used for original mapping of Tongass Roadless Areas requires that acres located within 1,200 from a road, or 600 feet from an evident harvest unit not be included in an Inventoried Roadless Area.

Alternatives 1 would not change the area's suitability as a Roadless Area, as Alternative 1 proposes no harvest at this time.

Alternative 2 has the least impact to the existing roadless area. Most of the harvest units are not noticeable, with the possible exception of the small patch cuts proposed. Implementation of Alternative 2 would result in a loss of 240 acres to the North Wrangell Roadless Area, resulting in the overall size being 7,357 acres.

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Alternative 4 would result in the building of a short section of temporary road into harvest unit 17. The area immediately surrounding the four proposed harvest units (and the associated road into unit 17) would be excluded from the North Wrangell Roadless Area. Implementation of Alternative 4 would result in a net loss of 353 acres, resulting in the total size of the North Wrangell Roadless Area being 7,244 acres.

Alternatives 3, 5, and 6 would not result in new roads within the boundaries of the North Wrangell Roadless Area. These alternatives would still, however, have an effect on the character of the area. The amount, and intensity, of harvest proposed in Alternatives 3, 5, and 6 would require that the area immediately surrounding the harvest units be excluded from the North Wrangell Roadless Area. Implementation of Alternative 6 would result in a net loss of 652 acres, with the overall size of 6,945 acres. Alternative 3 and 5 are very similar in their effect to the North Wrangell Roadless Area. Alternative 3 would result in a loss of 941 acres, while Alternative 5 would result in a loss of 962 acres, leaving a total of 6,656 acres, and 6,635 acres, respectively (see Table Roadless-1).

Table Roadless – 1. Roadless Acres Summary by Alternative

Alternative	Pristine Acres	Acres Managed But Not Substantially Altered ¹	Total Acres	Acres no longer suitable for Roadless Area Inventory
1995/TLMP (Forest Plan)	7,933 ²	0	7,933	N/A
Alt. 1 (Current Status 2000)	7,354 ³	243 ⁴	7597	0
Alt. 2	6,413	944	7,357	240
Alt. 3	6,413	243	6,656	941
Alt. 4	7,001	243	7,244	353
Alt. 5	6,392	243	6,635	962
Alt. 6	6,553	392	6,945	652

¹ Pending further direction, stands retaining greater than or equal to 60% retention are assumed to be “not substantially altered”.

² GIS mapping error tolerance account for a minor discrepancy (+70 ac.) in acreages from that stated in the Forest Plan.

³ Acreages have been updated to account for land conveyance to the state and harvested acres since 1995.

⁴ These acres are located outside the Doughnut Project Area and were harvested in 1996 with the Nootkatensis Timber Sale. The Nootkatensis Sale was a helicopter harvest that primarily removed standing dead yellow cedar. All harvest resulted in greater than 60% retention.

Affected Environment – Recreation Opportunity Spectrum

Recreation Opportunity Spectrum (ROS) is a system for planning and managing recreation resources that categorizes recreation opportunities into seven classes. Each class is defined in terms of the degree to which it satisfies certain recreation experience needs based on the extent to which the natural environment has been modified, types of facilities provided, the degree of outdoor skills needed to enjoy the area, and the relative density of recreation use. In timber planning projects, the most heavily weighted factors are the proposal of new roads, and proposed modification to the natural environment. The seven classes (from most natural to least natural) are: Primitive (P); Semi-Primitive Non-motorized (SPNM); Semi-Primitive Motorized (SPM); Roaded Natural (RN); Roaded Modified (RM); Rural (R); and Urban (U).

In the Doughnut Project Area, there are four ROS classes present (see Figure Recreation-1). The inventoried ROS classes include National Forest System lands in the Project Area, along with directly adjacent State Lands. Of the 6,063 acres which are mapped for ROS classes, existing acreage for the ROS

classes are: 2,083 acres of Semi-Primitive Non-motorized; 2,082 acres of Semi-Primitive Motorized; 815 acres of Roaded Natural, and 1,083 acres of Roaded Modified. Although there are currently no roads in the Doughnut Project Area, the inventoried Roaded Modified acres include existing State harvest units and roads on adjacent lands.

Environmental Consequences – Recreation Opportunity Spectrum

Alternatives 3, 4, 5, and 6 would result in a change to the existing ROS classes, mostly due to a combination of proposed roads and/or harvest units, which would be visible from travel routes. In mapping the ROS classes, we determined that roads, alone, are not the only requirement to change an area's setting from a Semi-Primitive class to a Roaded class. Noticeable harvest units would result in a change in the character of the land, as well. It should be noted, though, that the presence of a road would result in a permanent change to the ROS class, while harvest alone would eventually recover and could potentially be mapped as Semi-Primitive once the units were visually recovered.

Figures Recreation 2, 3, and 4 display changes to the ROS classes based on the different alternatives. The following table displays the number of acres of each ROS class resulting from implementation of the proposed alternatives. Percentages of the calculated acres of the whole project area are shown in parenthesis.

Table Recreation-1 - ROS Acres by Alternative

ROS Class	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6
SPNM	2,083 (34%)	2,083 (34%)	1,513 (25%)	1942 (32%)	1,513 (25%)	1,571 (26%)
SPM	2,082 (34%)	2,082 (34%)	760 (13%)	1251 (21%)	760 (13%)	1,218 (20%)
RN	815 (14%)	815 (14%)	0	0	0	0
RM	1,083 (18%)	1,083 (18%)	3,790 (62%)	2870 (47%)	3,790 (62%)	3,274 (54%)

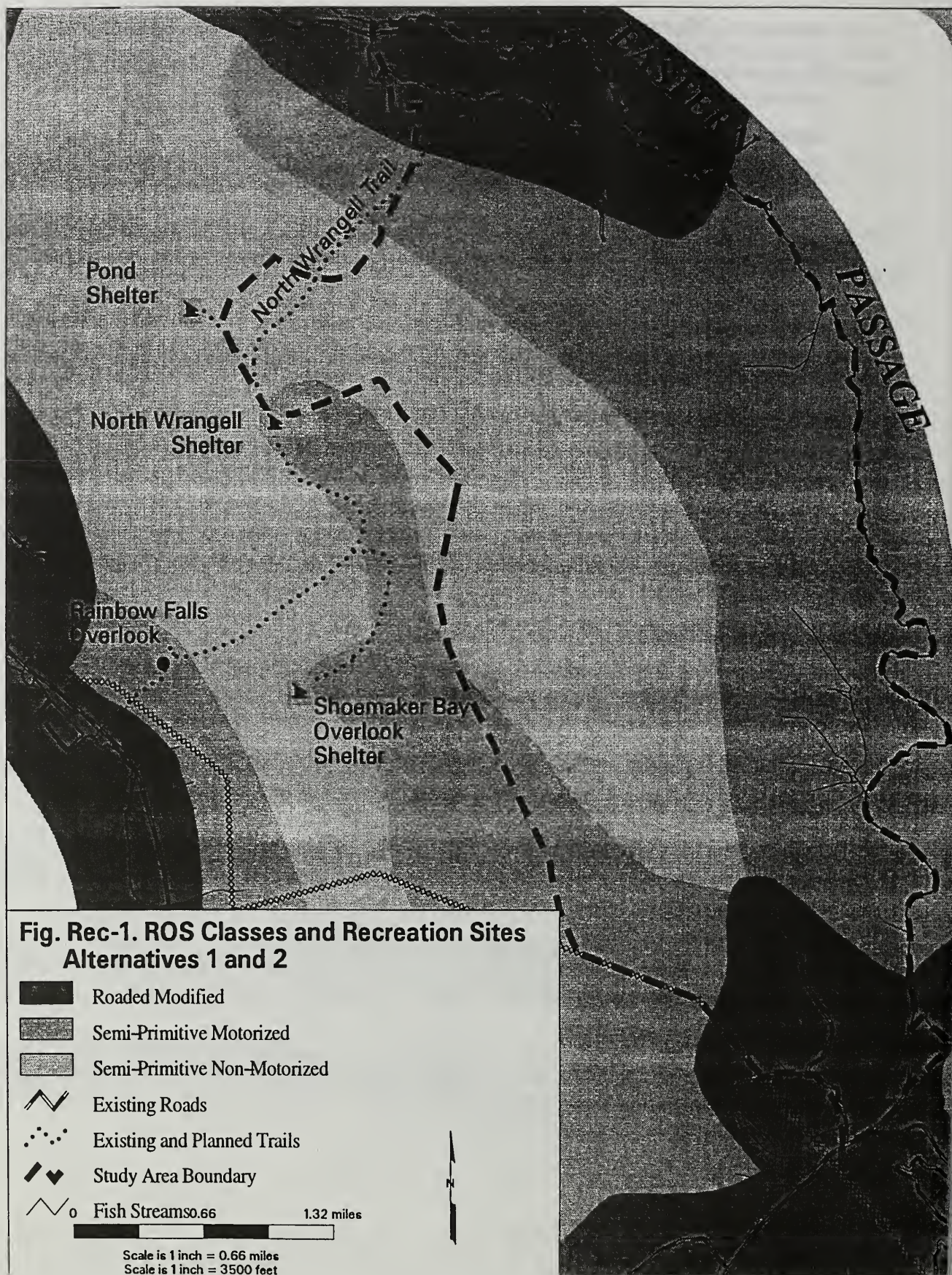
Alternatives 1 and 2 would result in no change to the existing ROS classes. Alternative 2 does not propose any new roads, and the light harvest prescription would likely result in an unnoticeable change to the landscape.

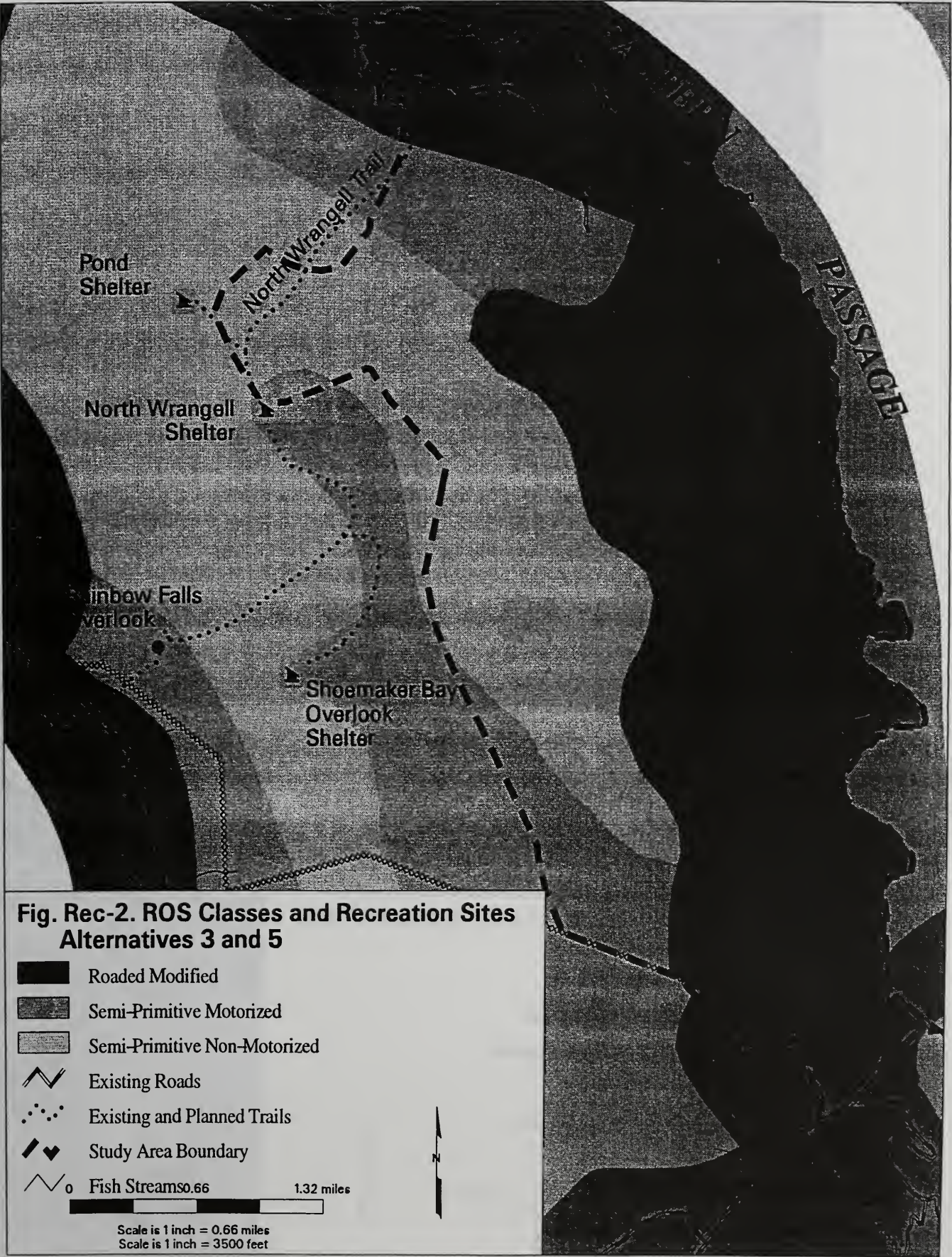
Of the action alternatives that would change the ROS classes, Alternative 4 would have the least impact, because it proposes the least amount of harvest, thus affecting fewer acres than the other action alternatives. The area surrounding the proposed road and harvest units would change from Semi Primitive Motorized to Roaded Modified.

Alternative 6 proposes less road building than Alternative 4, but quite a bit more harvest. Therefore, Alternative 6 would have a greater impact because all areas developed (whether by roads or noticeable harvest units) would result in a change from Semi-Primitive Motorized or Semi-Primitive Non-Motorized to Roaded Modified.

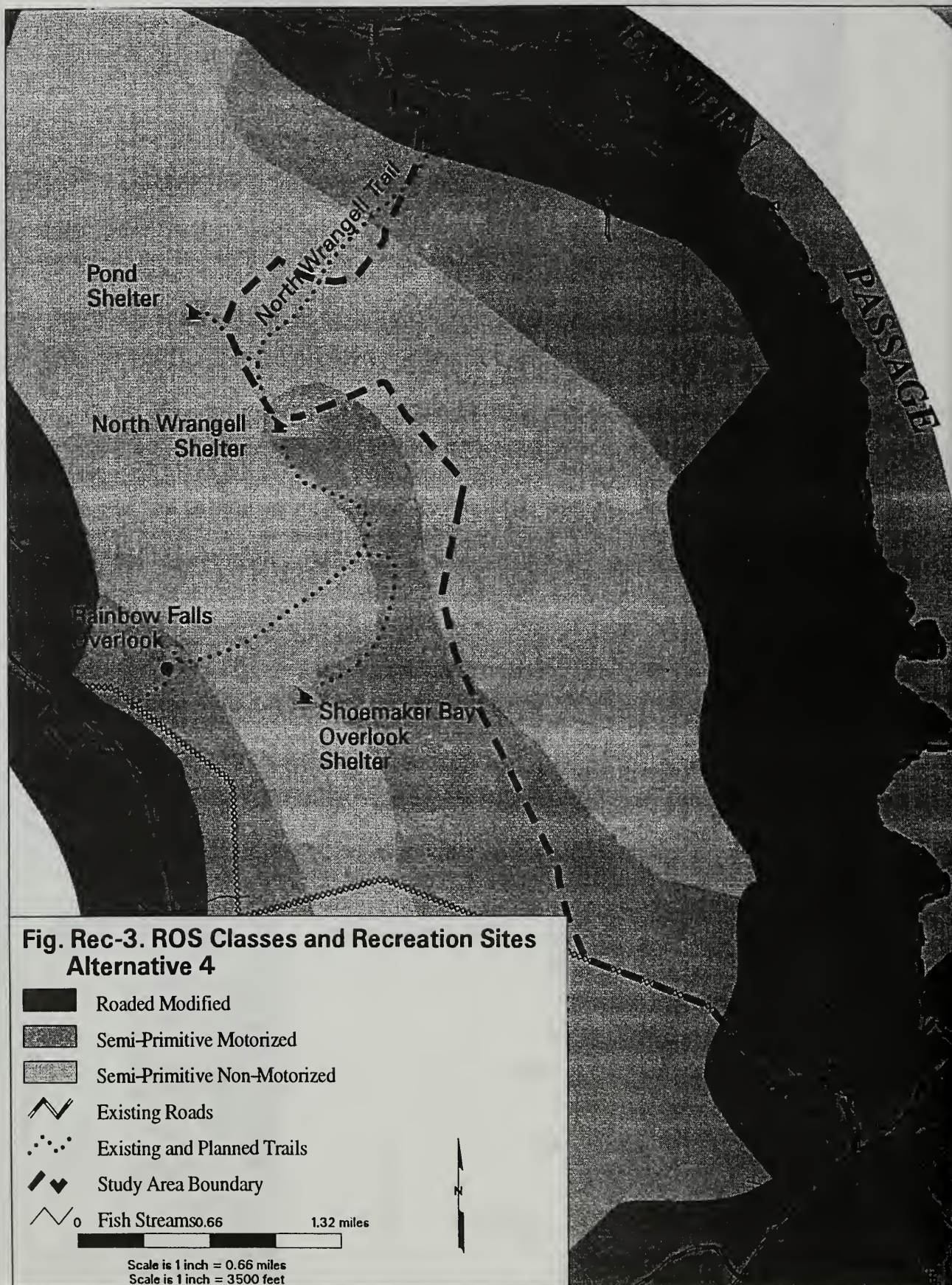
Alternatives 3 and 5 would have the most impact to ROS. Both alternatives would result in the same effect, even though Alternative 3 does not propose road building. Both propose the highest amount of harvest (in acres), with all harvest likely to be noticeable, resulting in the highest degree of change in the ROS mapping within the Doughnut Project Area.

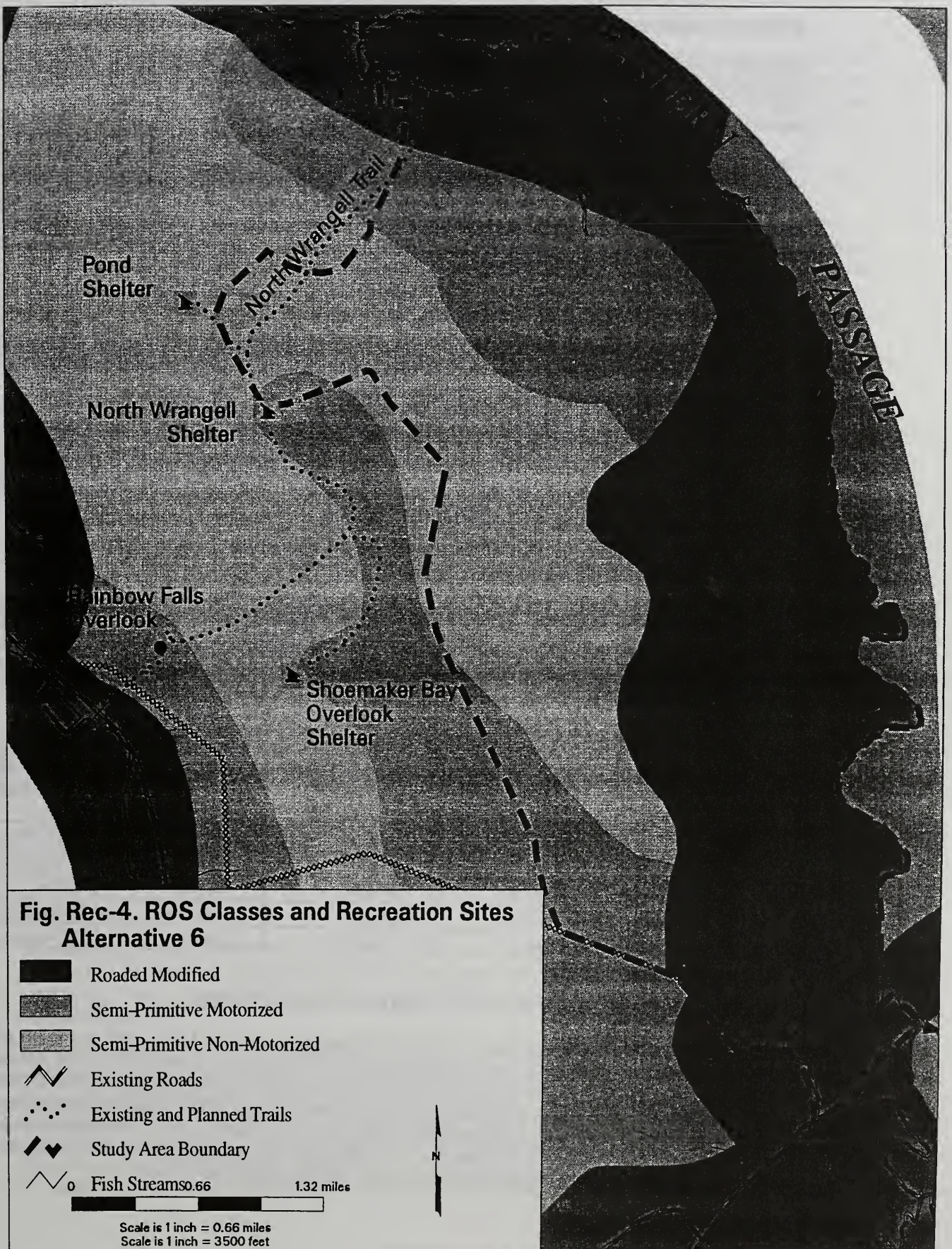
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Affected Environment – Recreation Places

There are three inventoried recreation places within the Doughnut Project Area: North Wrangell Trail (#22092.01), Institute Trail (#22092.02), and Pats Valley (#22092.04).

North Wrangell Trail (#22092.01) and Institute Creek Trail (#22092.02)

Small portions of both of these inventoried recreation places falls within the Doughnut Project Area. Neither the North Wrangell Trail nor the Institute Creek Trail actually crosses through the project area. Both trails are to the north and west of the Project Area. The Institute Creek Trail is used in the spring, summer, and fall for hiking, and in the winter for snowshoeing, cross country skiing, and snowmobiling. The North Wrangell Trail is currently under construction, but will eventually provide a loop trail from the Institute Creek Trail to the Spur Road extension, near Wrangell.

Pats Valley (#22092.04)

A small portion of the Pats Valley inventoried recreation place falls within the Doughnut Project Area. The majority of this recreation place is to the south and west of the Project Area. Recreationists use the Pats Valley recreation place year round for both motorized and non-motorized recreation. In the spring and summer, the area is used for recreational driving and berry picking as it is close to Wrangell and provides access to the roads in the Midpoint area, to the south of Pats Valley. In the fall, hunters use the Pats Valley road system to provide access for deer and moose hunting. Firewood gatherers use the area as a convenient, close to town area to gather firewood. In the winter, Pats Valley is a popular destination for both snowmobilers and cross-country skiers, as the road system provides a convenient trail for use, and also provides access to higher country for these activities.

Environmental Consequences - Recreation Places

All action alternatives would have some effect to recreationists in and around the area, due to logging activities associated with the sale. Any action alternative selected would probably have a timber sale contract length of 5 years. Table Recreation-2 lists the types of activities expected with each alternative, and the number of seasons those activities would likely occur. Specific effects to inventoried recreation places are discussed after the table.

Table Recreation - 2 - Logging Activities Associated with Each Alternative

	Road Construction	Log Hauling on Spur Road	Log Hauling on Pat's Creek Road	Cable Logging	Helicopter Logging
Alt. 2	None	2 Seasons	2 Seasons	None	2 Seasons
Alt. 3	None	2 Seasons	2 Seasons	None	2 Seasons
Alt. 4	1 Season	1 Season	1 Season	1 Season	None
Alt. 5	1 Season	2 Seasons	2 Seasons	2 Seasons	2 Seasons
Alt. 6	1 Season	2 Seasons	2 Seasons	2 Seasons	2 Seasons

North Wrangell Trail (#22092.01) and Institute Creek Trail (#22092.02)

Alternative 1 would result in no change to the North Wrangell or Institute Creek Trail recreation places. All action alternatives propose harvest of areas to the east of these trails. None of the action alternatives will result in direct effects to the trails, but it is likely that the sounds from logging and road construction activities, particularly helicopter yarding, will be noticeable to people hiking in the spring, summer, and fall. All action alternatives will result in some log hauling on the Spur Road near Wrangell. Because the North Wrangell Trail ties in with the Spur Road near Wrangell, people using this road to access the trail system may be affected by increased traffic due to log hauling on the Spur Road.

Pats Valley (#22092.04)

Alternative 1 would result in no changes to the Pats Valley recreation place. All of the action alternatives would result in increased traffic on the Pats Valley road due to log hauling. Alternatives 4, 5 and 6 propose a 1.4-mile extension of the existing road, which would result in more access for those people seeking road based recreation opportunities. Snowmobilers, in particular, would benefit from increased access to new snowmobiling country.

Cumulative Effects - Recreation

The State of Alaska has developed a 5-year plan that includes harvest of 7 units directly adjacent to the Doughnut project area. In this section we briefly describe the potential cumulative effects to the Doughnut Project Area. The degree of cumulative effects, naturally, will depend on the alternative the Forest Service chooses to implement; and whether or not the State fully implements the harvest proposed in their 5-year plan.

North Wrangell Roadless Area #227

The harvest units and possible roads the State has proposed would have little effect on the North Wrangell Roadless Area, as all road building and harvest will occur on State land (the North Wrangell Roadless Area is located entirely on National Forest System land). Some of the roads and units are adjacent to the State/National Forest boundary, and would result in a few acres within the North Wrangell Roadless Area no longer being suitable for inventory because they are within 1,200 feet of a road, or within 600 feet of a harvest unit. The amount of acres “disqualified” would be negligible. The quality of remoteness of the roadless area could be temporarily affected by the ongoing timber harvest and road building on State lands, regardless of the alternative selected by the Forest Service.

Recreation Opportunity Spectrum

The additional State harvest may result in a change to the existing ROS inventory, depending on which alternative the Forest Service implements.

If the Forest Service chooses Alternative 1 or 2, the proposed State harvest would require a change to the ROS inventory, because the ROS would not have been changed by the Forest Service decision. Much of the proposed State harvest is located in an area currently inventoried as Roaded Natural. If the State implements their 5-year plan, that area would need to be inventoried as Roaded Modified.

If the Forest Service chooses Alternative 3, 4, 5, or 6, the ROS inventory will be changed to depict the new conditions of the area (see Figures Recreation 2, 3, and 4). If the State builds the roads and harvests the units they propose in their 5-year plan, there would be no need to make any additional adjustments to the ROS inventory because the State lands will already have been changed to Roaded Modified based on the Forest Service decision.

Recreation Places

The additional State harvest would have minimal effects to the North Wrangell or Institute Creek Trails. Harvest on State lands would add to the length of time when people hiking the trail may hear the sounds of logging on occasion. Log hauling on the Spur Road Extension could have an effect to people accessing that trailhead.

The Pats Valley Recreation Place would see more traffic from log hauling if the State implements their plan. A possible cumulative effect may be an increased likelihood that the road built from the north (off the Spur Road Extension) and the road built from the south (off the Pats Valley Road) would eventually be connected to complete a driving loop on North Wrangell Island. If the Forest Service implements a roaded alternative (Alternatives 4, 5 or 6) the likelihood is much higher that a loop road will eventually be created. If the Forest Service implements Alternatives 1, 2, or 3, it is much less likely that the State or City of Wrangell will build the road necessary to complete a driving loop on North Wrangell Island.

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Sensitive Plants

The only sensitive plant found was the Choris bog orchid. This plant has since been taken off the sensitive plant list. There are no unique or unusual habitats that will be affected by this project. Implementation of any of the action alternatives is not expected to affect any sensitive plant populations.

Heritage Resources

Forest Plan standards and guidelines for the identification and protection of heritage (cultural and historical) resources apply. The project area has been surveyed for cultural properties, and all project activities [have been/will be] cleared with the State Historic Preservation Officer. No proposed activities are located in or near known cultural resource properties, or within areas of a high probability of such properties occurring.]

Other Environmental Considerations

This section is a disclosure of cumulative effects and other resources that may have minor or no effects from the project. The purpose is to document that these resources were considered as part of this analysis.

Cumulative Effects

Cumulative effects for this and other projects discussed below are in line with those effects analyzed in the cumulative effects analysis included in the Forest Plan (TLMP FEIS 1997), which is incorporated by reference. We considered cumulative effects of past, present, and reasonably foreseeable projects in the area, but such activities are not likely to lead to significant cumulative effects beyond those disclosed in this EA. Known actions include past, present and potential future harvest and road building.

Other Resources

Several resources and uses of the project area are likely to remain unaffected by the proposed action or alternatives, or will not be affected to a large degree. Even though effects of consequence are not anticipated, most of these resources are discussed in the sections of this chapter, which follow the introduction, to the extent that measurable effects or differences between alternatives are present. Resources or uses for which no measurable effects were identified are discussed briefly here.

Air Quality - All of the action alternatives will have limited, short-term effects on ambient air quality. Such effects, in the form of vehicle emissions and dust, are likely to be indistinguishable from other local sources of airborne particulates, including other motor vehicle emissions, dust from road construction and motor vehicle traffic, residential and commercial heating sources, and marine traffic.

Facilities - There are no logging camps or Forest Service administrative sites in the Doughnut project area.

Minerals - There are no known mineral occurrences of commercial value within the Doughnut project area. Bureau of Land Management records indicate no mining claims or patented mining claim groups within the Doughnut project area.

The proposed action would have no direct or indirect impact on mineral resources. In general, the project would affect mining activities only by providing easier access for mapping and surveying due to new road construction in less developed or underdeveloped areas. Geologic mapping would also be enhanced by increased exposure due to road construction and quarry development.

Plans of Other Agencies - The CEQ regulation implementing NEPA require a determination of possible conflicts between the proposed action and the objectives of federal, State, and local land use plans, policies, and controls for the area. The major land use regulations of concern are Section 810 of the Alaska National Interest Lands Conservation Act (ANILCA), the Coastal Zone Management Act (CZMA), and the State of Alaska's Forest Practices Act. See the "Findings and Disclosures" section of Chapter 2 for discussion of compliance with these laws. State compliance is also discussed at the end of Chapter 1. ANILCA Section 810 requirements pertain to subsistence; these are also discussed in the Subsistence section of this chapter.

Findings and Disclosures

Several of the laws and executive orders listed in Chapter 1 require project-specific findings or other disclosures. These are included here, and also in the Decision Notice. They apply to all alternatives considered in detail in this EA.

National Forest Management Act - All project alternatives fully comply with the Modified 1997 Tongass Forest Plan and the Alaska Regional Guide. This project incorporates all applicable Forest Plan forest-wide standards and guidelines and management area prescriptions as they apply to the project area, and complies with Forest Plan goals and objectives. This includes the additional direction contained in the 1999 Record of Decision for the Forest Plan Revision. All required interagency review and coordination has been accomplished; new or revised measures resulting from this review have been incorporated.

The Modified 1997 Forest Plan complies with all resource integration and management requirements of 36 CFR 219 (219.14 through 219.27). Application of Forest Plan direction for the Doughnut project ensures compliance at the project level. Specific NFMA findings pertaining to silvicultural systems are included in [Chapter 3 and/or the project planning record].

Endangered Species Act - None of the alternatives is anticipated to have a direct, indirect or cumulative effect on any threatened or endangered species in or outside the project area. Consultations with the U.S. Fish and Wildlife Service and the National Marine Fisheries Service have been conducted, and these agencies have concurred that the proposed project is not likely to affect any threatened or endangered species. A complete biological assessment is included in the planning record.

Tongass Timber Reform Act - Application of Forest Plan riparian standards and guidelines ensures that no commercial timber harvest will occur within 100 feet of any Class I stream or any Class II stream flowing directly into a Class I stream.

National Historic Preservation Act - Cultural resource surveys of varying intensities have been conducted, following inventory protocols approved by the Alaska State Historic Preservation Officer. Native communities have been contacted and public comment encouraged. The consultation and concurrence process with the State Historic Preservation Officer has been concluded. No significant effects on known cultural resources are anticipated.

Alaska National Interest Lands Conservation Act (ANILCA) - An ANILCA Section 810 subsistence evaluation was conducted. . The subsistence analysis led to the conclusion that there may be the possibility of a significant restriction on subsistence use of deer on Wrangell Island as a result of cumulative effects (See Subsistence under Other Environmental Resources.).

Clean Water Act - The design of harvest units and roads is in accordance with Forest Plan standards and guidelines, the Alaska Regional Guide, Best Management Practices, and applicable Forest Service manual and handbook direction. The harvest unit and road cards for the Doughnut Timber Sale project (Appendices A and B) include specific requirements prescribed to prevent or reduce non-point sediment sources. Monitoring and evaluation of the implementation and effectiveness of Forest Plan standards and guidelines and Best Management Practices will occur. Project activities are expected to meet all applicable State of Alaska water quality standards.

All roads, landings and rock pits will be designed and constructed in accordance with the applicable Best Management Practices listed at 33 CFR 323.4(a). No permits under Section 404 of the Clean Water Act will be required.

Clean Air Act - Emissions anticipated from the implementation of any project alternative will be of short duration and are not expected to exceed State of Alaska ambient air quality standards (18 AAC 50).

Coastal Zone Management Act - Forest Plan standards and guidelines applicable to the timber harvest activities of the Doughnut project meet or exceed the requirements of the State of Alaska Forest Practices Act. The State of Alaska, Office of Governmental Coordination, has conducted a consistency review of the

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project and, subject to the incorporation of specifically agreed upon measures, concurs with the Forest Service that the project is consistent with the Coastal Zone Management Act.

Executive Order 11988 - No timber harvest or new road construction is proposed on floodplains.

Executive Order 11990 - Executive Order 11990 requires Federal agencies to avoid to the extent possible the long and short-term adverse impacts associated with the destruction or modification of wetlands. Road construction requires the filling-in of wetlands and results in a permanent loss of wetland habitat. Road construction through wetlands is avoided where possible, impacts are minimized by application of specific Best Management Practices. Timber harvesting on forested wetlands temporarily alters the forest structure but the affected wetlands will still meet wetland classification and maintain wetland functions.

Executive Order 12898 - Implementation of any project alternative is not anticipated to cause disproportionate adverse human health or environmental effects to minority or low-income populations. (See also the ANILCA Section 810 findings.)

Executive Order 12962 - Executive Order 12962 directs Federal agencies to conserve, restore, and enhance aquatic systems to provide for increased recreational fishing opportunities nationwide. The Doughnut Timber Sale attempts to minimize impacts on aquatic systems through project design, application of forest plan standards and guides, and other site-specific mitigation measures. Recreational fishing opportunities will remain essentially the same due to these protection measures, and due to the fact that access to known recreational fisheries in the area (Pat Creek and Hermit Creek) will be unaffected by the project.

Short-term Use and Long-term Productivity

Short-term uses, and their effects, are those that occur annually or within the first few years of project implementation. Long-term productivity refers to the capability of the land and resources to continue producing goods and services long after the project has been implemented. Under the Multiple-Use Sustained-Yield Act, and the National Forest Management Act, all renewable resources are to be managed in such a way that they are available for future generations. The harvesting and use of standing timber can be considered a short-term use of a renewable resource. As a renewable resource, trees can be reestablished and grown again if the long-term productivity of the land is maintained. This long-term productivity is maintained through the application of the resource protection measures described in Chapter 2, in particular those applying to the soil and water resources.

Irreversible and Irretrievable Commitments

Irreversible commitments are decisions affecting non-renewable resources such as soils, wetlands, unroaded areas, and cultural resources. Such commitments are considered irreversible because the resource has deteriorated to the point that renewal can occur only over a long period of time or at a great expense, or because the resource has been destroyed or removed. The construction of roads for timber harvesting is an irreversible action because of the time it takes for a constructed road to revert to natural conditions.

Irretrievable commitments represent opportunities foregone for the period during which resource use or production cannot be realized. Such decisions are reversible, but the production opportunities foregone are irretrievable. As an example, deferring timber harvest at this time in certain areas due to resource concerns or economics would be an irretrievable commitment of timber volume otherwise obtainable. The commitment is irretrievable rather than irreversible, because future entries could harvest those areas if they are still part of the suitable timber base.

Unavoidable Environmental Effects

Although we designed harvest units and roads to avoid adverse consequences, and have included mitigation measures, some environmental impacts cannot be completely mitigated and would be expected to occur.

Air quality would diminish on a recurring, temporary basis due to the construction of roads, timber harvest, helicopter operation, and hauling.

Although BMP's are designed to protect soil and water, some potential for surface erosion, sediment production, channel erosion, and mass movement does exist. Road development poses a risk of sediment production. However the risk posed by the proposed roads is not unusually high. Road locations are largely in stable terrain. Helicopter yarding reduces the risks associated with road building. Sediment production could displace fish or result in a loss of habitat near stream crossings and temporarily affect the function of a stream.

Energy Requirements and Conservation Potential

The implementation of the proposed alternatives will require the expenditure of energy (consumption of fuel). The amount of energy used varies by alternative, based upon the timber volume harvested, the type of harvest system used, the amount of road constructed, and the sale preparation and administration.

Fuel Consumption

Fuel consumption estimates are based upon estimates from the Skipping Cow DEIS (1999). These estimates are likely to be a little high for the Doughnut project due to logistical advantages of working on Wrangell Island versus Zarembo Island. Fuel consumption requirements were estimated as follows:

Timber Sale Preparation and Administration	1.56 gallons per MBF
Cable Logging	2.00 gallons per MBF
Helicopter Logging	8.00 gallons per MBF
Load, Haul, Dump, and Tow	8.00 gallons per MBF
Road Construction	4,000 gallons per mile
Road Maintenance	20 gallons per mile

The estimated fuel consumption required for each alternative is displayed in Table Fuel-1

Table Fuel-1

Activity	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6
Cable Logging	0	0	0	4,316	1,850	1,746
Helicopter Logging	0	31,696	64,368	0	56,968	32,200
Load, Haul, Dump, Tow	0	31,696	64,368	17,264	64,368	39,184
Road Construction	0	0	0	10,400	5,600	5,600
Road Maintenance	0	0	0	28	28	28
Timber Sale Prep. /Admin.	0	6,180	12,552	3,366	12,552	7,641
Total Consumption	0	69,572	141,288	38,374	141,366	86,399
Ave. Gallons per MBF	0	17.6	17.6	16.4	17.6	17.6

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Conservation Potential

To conserve fuel, and to minimize costs, the Forest Service has undertaken studies nationwide and on the Tongass National Forest. This has allowed experimentation with new or different techniques. Cable yarding uses about 75 percent as much fuel as shovel yarding and about 25 percent as much fuel as helicopter yarding. However, helicopter yarding can reduce road-building needs, saving fuel needed for road construction, road maintenance, and trucks hauling logs on the roads.

The use of low-tire-pressure equipment (central tire inflation [CTI]) during road construction and logging has also been shown to decrease costs, both in nationwide studies and in studies on the Tongass. Studies on Mitkof Island indicate that 10-14 percent less rock was needed during road construction, resulting in a cost savings of approximately \$450,000. It is predicted that costs for rock replacement/road maintenance, log truck fuel, and tire repair/replacement will decrease using this system. Cost savings have been proven to be substantial enough that the Forest Service provides a contract clause allowing a reduction in deposits for rock replacement when low-tire-pressure equipment is used.

The use of cable yarding equipment fitted with mechanical or hydraulic interlocks reduces yarding costs, because one does not have to ride the throttle and brake simultaneously to provide deflection for the turn of logs.

Social and Economic Effects

We do not anticipate measurable social or economic effects due to the implementation of this project, beyond those disclosed in chapter 3 (Issues 1 thru 4). Broad-based assessments of these effects were completed in Forest Plan FEIS, 1997 (Chapter 3).

A Civil Rights Impact Analysis (CRIA) is used to identify any possible impacts associated with a proposed project based upon an individual's civil rights (religion, race, color, national origin, age, gender, disability, marital status, political beliefs). We have no indication, nor have any comments been received, that would lead us to believe that any of the proposed project would impact any individual's civil rights. This conclusion ties to the Economic and Social Environments Analysis included in Chapter 3 of the Forest Plan FEIS (TLMP FEIS, 1997).

Chapter 4

Lists

List of Preparers
Glossary of Terms
Literature Cited

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Glossary of Terms

Access

The opportunity to approach, enter, and make use of public lands.

Access Management

Acquiring rights and developing and maintaining facilities needed by people to get to and move through public lands (physical attributes).

Adaptive Management

A continuous process of action-based planning, monitoring, research, evaluation, and adjustment with the objective of improving implementation and achieving desired management goals and objectives.

Alaska National Interest Lands Conservation Act (ANILCA)

Passed by Congress in 1980, this legislation designated 14 National Forest wilderness areas in Southeast Alaska. The Alaska National Interest Lands Conservation Act of December 2, 1980. Public Law 96-487, 96th Congress, 94 Stat. 2371-2551. In Section 810 requires evaluations of subsistence impacts before changing the use of these lands.

Alaska Native Claims Settlement Act (ANCSA)

Public Law 92-203, 92nd Congress, 85 Stat. 2371-2551. Approved December 18, 1971, ANCSA provides for the settlement of certain land claims of Alaska natives and for other purposes.

Allowable Sale Quantity (ASQ)

ASQ refers to the maximum quantity of timber that may be sold each decade from the Tongass National Forest. This quantity, expressed as a board foot measure, is calculated per timber utilization standards specified in the Alaska Regional Guide, the number and type of acres available for timber management, and the intensity of timber management. The ASQ was calculated at 4.5 billion board feet per decade for the Tongass National Forest.

Alluvial Fan

A cone-shaped deposit of organic and mineral material made by a stream where it runs out onto a level plain or meets a slower stream.

Alluvium

Material deposited by rivers or streams, including the sediment laid down in river beds, floodplains and at the foot of mountain slopes and estuaries.

Alpine

Parts of mountains above tree growth and/or the organisms living there.

Alternative

One of several policies, plans, or projects proposed for decision making.

Anadromous Fish

Anadromous fish (such as salmon, steelhead, and sea run cutthroat trout) spend part of their lives in freshwater and part of their lives in saltwater.

Background

The distant part of a landscape. The seen or viewed area located from three or five miles to infinity from the viewer. (See "Foreground" and "Middleground".)

Beach Fringe

The area inland from salt water shorelines, which is typically forested.

Bedload

Sand, silt, and gravel, or soil and rock debris rolled along the bottom of a stream by the moving water.

Best Management Practice (BMP)

Land management methods, measures, or practices intended to minimize or reduce water pollution. Usually BMPs are applied as a system of practices rather than a single practice. BMPs are selected on the basis of site-specific conditions that reflect natural background conditions and political, social, economic, and technical feasibility.

Biological Diversity (Biodiversity)

The variety of life in all its forms and at all levels. This includes the various kinds and combinations of: genes; species of plants, animals, and microorganisms; populations; communities; and ecosystems. It also includes the physical and ecological processes that allow all levels to interact and survive. The most familiar level of biological diversity is the species level, which is the number and abundance of plants, animals, and microorganisms.

Blowdown

See windthrow.

Board Foot (BF)

A unit of wood 12" X 12" X 1". One acre of commercial timber in Southeast Alaska on the average yields 28,000-34,000 board feet per acre (ranging from 8,000-90,000 board feet per acre). One million board feet (MMBF) would be the volume of wood covering one acre two feet thick. One million board feet yields approximately enough timber to build 120 houses or 75,555 pounds of dissolving pulp.

Brush Disposal

Cleanup and disposal of slash and other hazardous fuels within the forest or project areas.

Buffer

An area around a resource where timber harvest is restricted or prohibited. For example, the Tongass Timber Reform Act (TTRA) requires that timber harvest be prohibited in an area no less than 100 feet on each side of all Class I streams and Class II streams which flow directly into Class I streams. This 100-foot area is known as a "stream buffer".

Capability

An evaluation of a resource's inherent potential for use.

Clearcut

The harvesting in one cut of all trees on an area. The area harvested may be a patch, strip, or stand large enough to be mapped or recorded as a separate class in planning for sustained yield. Clearcut size on the Tongass National Forest is limited to 100 acres, except for specific conditions noted in the Alaska Regional Guide.

Code of Federal Regulations (CFR)

A codification of the general and permanent rules published in the Federal Register by the executive departments and agencies of the Federal Government.

Commercial Fishery

Fish, shellfish, or other fishery resources taken or processed within a designated area for commercial purposes

Commercial Forest Land (CFL)

Productive Forest and that is producing or capable of producing crops of industrial wood and is not withdrawn from timber utilization by statute or administrative regulation. This includes areas suitable for management and generally capable of producing in excess of 20 cubic feet per acre of annual growth or in excess of 8,000 board feet net volume per acre. It includes accessible and inaccessible areas.

Normal CFL: Timber that can be economically harvested with locally available logging systems. Composed of two categories:

Standard: Timber that can be economically harvested with locally available logging systems, such as highlead or short-span skyline.

Special: Timber that is in areas where special consideration is needed to protect other resources

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but can be harvested with locally available logging systems.

Non-standard CFL: Timber that cannot be harvested with locally available logging systems and would require the use of other logging systems such as helicopter or long-span skyline.

Confluence

The point where two streams meet.

Connectivity

A measure of the extent that forest areas between or outside reserves provide habitat for breeding, feeding, dispersal, and movement.

Corridor

Connective links of certain types of vegetation between patches of suitable habitat which are necessary for certain species to facilitate movement of individuals between patches of suitable habitat. Also refers to transportation or utility rights-of-way.

Cover

Refers to trees, shrubs, or other landscape features that allow an animal to partly or fully conceal itself.

Critical Habitat

Specific terrain within the geographical area occupied by threatened or endangered species. Physical and biological features that are essential to conservation of the species and which may require special management considerations or protection are found in these areas.

Crown

The tree canopy. The upper part of a tree or woody plant that carries the main branch system and foliage.

Cruise

Refers to the general activity of determining timber volumes and quality as opposed to a specific method.

Cultural Resources

See Heritage Resources.

Cumulative Effects

The impacts on the environment resulting from additional incremental impacts of past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-federal) or person undertakes such actions. Cumulative impacts can result from individually minor but collectively significant actions occurring over time.

Diameter Breast Height (DBH)

The diameter of a tree measured 4 feet 6 inches from the ground.

Deer Winter Range

A combination of environmental elements that support Sitka black-tailed deer under moderately severe or severe winter conditions. Usually associated with high volume old-growth stands at low elevations and south aspects.

Developed Recreation

Recreation that requires facilities that, in turn, result in concentrated use of an area. Facilities in these areas might include roads, parking lots, picnic tables, toilets, drinking water, and buildings.

Direct Employment

Jobs that are immediately associated with a timber sale, including, for example, logging, sawmills, and pulpmills.

Dispersal

The movement, usually one way, of plants and animals from their point of origin to another location where they subsequently produce offspring.

Distance Zone

Areas of landscapes denoted by specified distances from the observer (foreground, middleground, or background). Used as a frame of reference in which to discuss landscape characteristics of management activities.

Diversity

The distribution and abundance of different plant and animal communities and species within the area controlled by the Forest Plan.

Eagle Nest Tree Buffer Zone

A 330-foot radius around eagle nest trees established in an Agreement between the U.S. Fish and Wildlife Service and the Forest Service.

Ecological Province

Twenty-one ecological subdivisions of Southeast Alaska that are identified by generally distinct ecological, physiographic, and biogeographic features. Plant and animal species composition, climate, and geology within each province are generally more similar within than among adjacent provinces. Historical events (such as glaciers and uplifting) are important to the nature of the province and to the barriers that distinguish each province.

Ecosystem

A community of organisms and its physical setting. An ecosystem, whether a fallen log or an entire watershed, includes resident organisms, non-living components such as soil nutrients, inputs such as rainfall, and outputs such as organisms that disperse to other ecosystems.

Effects

Effects, impacts, and consequences as used in this environmental impact statement are synonymous. Effects may be ecological (such as the effects on natural resources and on the components, structures, and functioning of affected ecosystems), aesthetic, historical, cultural, economic, or social, and may be direct, indirect, or cumulative.

Direct Effects: Results of an action occurring when and where the action takes place.

Indirect Effects: Results of an action occurring at a location other than where the action takes place and/or later in time, but in the reasonably foreseeable future.

Cumulative Effects: See Cumulative Effects.

Endangered Species

Any species of animal or plant that is in danger of extinction throughout all or a significant portion of its range. Plant or animal species identified by the Secretary of the Interior as endangered in accordance with the 1973 Endangered Species Act. See also, threatened species, sensitive species.

Endemic

Restricted to a particular locality. For example, a particular species or subspecies may occur on only one or a very few islands.

Environmental Assessment (EA)

A statement of environmental effects for a major Federal action which is released to the public and other agencies for comment and review prior to a final management decision. Required by Section 102 of the National Environmental Policy Act (NEPA).

Estuary

For the purpose of this EIS process, estuary refers to the relatively flat, intertidal, and upland areas generally found at the heads of bays and mouths of streams. They are predominately mud and grass flats and are not forested except for scattered spruce or cottonwood.

Even-Aged Stand Management

The application of a combination of actions that result in the creation of stands in which trees of essentially the same age grow together. The difference in age between trees in forming the main canopy level of a stand usually does not exceed 20 percent of that age of the stand at harvest rotation age. Clearcut, shelterwood, or seed tree cutting methods produce even-aged stands.

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Executive Order

An order or regulation issued by the President or some administrative authority under his or her direction.

Fen

A tract of low, wet ground containing sedge peat, relatively rich in mineral salts, alkaline in reaction, and characterized by slowly flowing water. Unlike peatlands (commonly referred to as bogs or muskegs), fens contribute to stable stream flows, provide nutrient input to streams and often contribute to fish rearing habitat.

Floodplain

That portion of a river valley, adjacent to the river channel, which is covered with water when the river overflows its banks at flood stages.

Forbs

Herbaceous plants; generally smaller flowering plants. Not included in the grass, shrub or tree categories.

Foreground

The stand of trees immediately adjacent to a scenic area, recreation facility, or forest highway; area located less than 1/4 mile from the viewer. See also, Background and Middleground.

Forest and Rangeland Renewable Resources Planning Act of 1976 (RPA)

Amended in 1976 by the National Forest Management Act. See RPA Assessment and Program.

Forest or Forest Land

National Forest lands currently supporting or capable of supporting forests at a density of 10 percent crown closure or better. Includes all areas with forest cover, including old growth and second growth, and both commercial and non-commercial forest land.

Forested Habitat

All areas with forest cover. Used in this EIS to represent a general habitat zone.

Forested Wetland

A wetland whose vegetation is characterized by an overstory of trees that are 20 feet or taller.

Forest Plan

The Tongass Land Management Revision, signed in 1997. This is the 10-year land allocation plan for the Tongass National Forest that directs and coordinates planning, the daily uses, and the activities carried out within the forest.

Fragmentation

An element of biological diversity that describes the natural condition of habitats in terms of the size of discrete habitat blocks or patches, their distribution, the extent to which they are interconnected, and the effects of management on these natural conditions. Also the process of reducing the size and connectivity of stands within a forest.

FSH

Forest Service Handbook.

FSM

Forest Service Manual.

Geographic Information System (GIS)

An information processing technology to input, store, manipulate, analyze, and display spatial and attribute data to support the decision-making process. It is a system of computer maps with corresponding site specific information that can be electronically combined to provide reports and maps.

Group Selection

Small groups of trees up to 2 acres in size are harvested.

Guideline

A preferred or advisable course of action or level of attainment designed to promote achievement of goals and objectives.

Habitat

The sum total of environmental conditions of a specific place occupied by an organism, population, or community of plants and animals.

Habitat Capability

The estimated number of healthy animals that a habitat can sustain. Often shown as a relative percentage of optimum habitat conditions.

Habitat Suitability Index

This is a value assigned to a unit of land using a computerized model that relates vegetative and geographic characteristic (e.g. stand volume, proximity to a stream or cliff, slope, aspect, etc.) to the land unit's value for a particular wildlife species. Values generally range from 0 to 1, with 1 being the best. The Habitat Capability Models used to generate HSIs were developed by interagency teams of biologists using the best available information including research results and best professional judgement.

Heritage Resources

Also known as Cultural Resources. Historic or prehistoric objects, sites, buildings, structures, and their remains, resulting from past human activities.

Important Subsistence Use Area

Important Subsistence Use Areas include the "most -reliable" and "most often hunted" categories from the TRUCS survey and from subsistence survey data from ADFG, the University of Alaska, and the Forest Service, Region 10. Important use areas include both intensive and extensive use areas for subsistence harvest of deer, furbearers, and salmon.

Indirect Employment

The jobs in service industries that are associated with a timber sale including, for example, suppliers of logging and milling equipment.

Infrastructure

The facilities, utilities, and transportation systems needed to meet public and administrative needs.

Inoperable Timber

Timber that cannot be harvested by any proven method because of potential resource damage, extremely adverse economic considerations, or physical limitations.

Interdisciplinary Team (IDT)

Two or more natural resource planners who use relevant information to develop alternative design and comparison for a proposed project. The team insures that integrated use of environmental, social, and economic information is clearly presented so the best decision can be made.

Intermediate Stand Treatments

A stand management treatment which manipulates stand growth, composition, structure, or tree quality. Intermediate treatments include thinning, pruning, clearing, weeding, liberation, release, improvement, salvage, and sanitation cutting to achieve different management objectives. These stand treatments do not attempt to obtain new tree regeneration, and they occur before the final regeneration harvest. Some treatments such as salvage cutting or commercial thinning result in the harvest of forest products.

Invertebrates

Animals without a backbone.

Irretrievable Commitments

Losses of production or use of renewable natural resources for a period of time. For example, timber production from an area is irretrievably lost during the time an area is allocated to a no-harvest prescription; if the allocation is changed to allow timber harvest, timber production can be

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resumed. The production lost is irretrievable, but is not irreversible.

Irreversible Commitments

Decisions causing changes which cannot be reversed. For example, if a roadless area is allocated to allow timber harvest and timber is actually harvested, that area cannot, at a later date, be allocated to wilderness. Once harvested, the ability of that area to meet wilderness criteria has been irreversibly lost. Often applies to nonrenewable resources such as minerals and cultural resources.

Issue

A point, matter, or section of public discussion or interest to be addressed or decided.

Knutsen-Vandenburg Fund (KV)

The portion of timber sale receipts collected and used for reforestation and other renewable resource projects on the sale area.

Landslides

The moderately rapid to rapid down slope movement of soil and rock materials that may or may not be water-saturated.

Log Transfer Facility (LTF)

A facility that is used for transferring commercially harvested logs to and from a vessel or log raft, or the formation of a log raft. It is wholly or partially constructed in waters of the United States and location and construction are regulated by the 1987 Amendments to the Clean Water Act. Formerly termed "terminal transfer facility" or "log dump".

Logging Systems

Cable: Ground based yarding of logs using a steel cable to pull logs to a landing.

Helicopter: Flight path cannot exceed 40 percent downhill or 30 percent uphill; landings must be selected so there is adequate room for the operation and so that the helicopter can make an upwind approach to the drop zone.

MBF

A thousand board feet net sawlog and utility volume.

MMBF

A million board feet net sawlog and utility volume.

Management Indicator Species (MIS)

Species selected in a planning process that are used to monitor the effects of planned management activities on viable populations of wildlife and fish..

Management Prescriptions

Method of classifying land uses presented in the Forest Plan. Replaces the Land Use Designations (LUDs) originally presented in TLMP.

Market Pond Value

Also known as pond log value. Selling value minus manufacturing costs. Pond log values are the price a timber buyer would pay for a log at the mill site.

Mass Movement

The downslope movement of a block or mass of soil. This usually occurs under conditions of high-soil moisture and does not include individual soil particles displaced as surface erosion.

Maritime Climate

Weather conditions controlled by an oceanic environment characterized by small annual temperature ranges and high precipitation.

Memorandum of Understanding (MOU)

A legal agreement between the Forest Service and others agencies resulting from consultation between agencies that states specific measures the agencies will follow to accomplish a large or complex project. A memorandum of understanding is not a fund obligating document.

Middleground

The visible terrain beyond the foreground where individual trees are still visible but do not stand out distinctly for the landscape; area located from 1/4 to 5 miles from the viewer. See also, Foreground and Background.

Mineral Soils

Soils consisting predominately of, and having its properties determined by, mineral material.

Minimum Viable Population

A population with the estimated numbers and distribution of reproductive individuals to maintain the population over time.

Mitigation

Measures designed to counteract environmental impacts or to make impacts less severe. These may include: avoiding an impact by not taking a certain action or part of an action; minimizing an impact by limiting the degree or magnitude of an action and its implementation; rectifying the impact by repairing, rehabilitating, or restoring the affected environment; reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; or compensating for the impact by replacing or providing substitute resources.

Mixed Conifer

In Southeast Alaska, mixed conifer stands usually consist of western hemlock, mountain hemlock, Alaska yellowcedar, Western redcedar, and Sitka spruce species. Shorepine may occasionally be present.

Model

A representation of reality used to describe, analyze, or understand a particular concept. A model may be a relatively simple qualitative description of a system or organization, or a highly abstract set of mathematical equations. A model has limits to its effectiveness, and is used as one of several tools to analyze a problem.

Monitoring

A process of collecting information to evaluate whether or not objectives of a project and its mitigation plan are being realized. Monitoring can occur at different levels: to confirm whether mitigation measures were carried out in the manner called for, to determine whether the mitigation measures were effective, or to validate whether overall goals and objectives were appropriate. Different levels call for different methods of monitoring.

Multiple-aged Stands

An intermediate form of stand structure between even and uneven-aged stands. These stands generally have two or three distinct tree canopy levels occurring within a single stand.

Multiple Entry

More than one stand or land treatment activity during a rotation of a stand or area.

Multiple Use

The management of all the various renewable resources of the National Forest System to be used in the combination that will best met the needs of the American people.

Muskeg

In Southeast Alaska a type of bog that has developed over thousands of years in depressions or flat areas on gentle to steep slopes. Also called peatlands.

National Environmental Policy Act (NEPA) of 1969

An Act to declare a national policy which will encourage productive and enjoyable harmony between humankind and the environment, to promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of humanity, to enrich the understanding of the ecological systems and natural resources important to the Nation, and to establish a Council on Environmental Quality (The Principal Laws Relating to Forest Service Activities, agric. Handb. 453. USDA Forest Service, 359 p.).

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National Forest Management Act (NFMA)

A law passed in 1976 as an amendment to the Forest and Rangeland Renewable Resources Planning Act requiring the preparation of Regional Guides and Forest Plans and the preparation of regulations to guide that development.

National Wild and Scenic River System

Rivers with outstanding scenic, recreational, geological, fish and wildlife, historic, cultural, or other similar values designated by Congress under the Wild and Scenic Rivers Act of 1968 and amended in 1986, for preservation of their free-flowing condition. May be classified and administered under one or more of the following categories: Wild, Scenic, and/or Recreational.

Net Sawlog Volume

Tree or log volume suitable in size and quality to be processed into lumber. In Southeast Alaska, depending on the market, the volume may be processed as pulp or lumber.

No action Alternative

The most likely condition expected to exist in the future if current management direction were to continue unchanged.

Non-commercial Forest Land

Land with more than 10 percent cover of commercial tree species but not qualifying as Commercial Forest land. These are typically very steep.

Non-Forest Land

Land that has never supported forests and lands formerly forested but now developed for such nonforest uses as crops, improved pasture, etc.

Non-interchangeable Components (NIC's)

Increments of the suitable land base and their contribution to the allowable sale quantity (ASQ) that are established to meet Forest Plan objectives. NIC's are identified as parcels of land and the type of timber thereon which are differentiated for the purpose of Forest Plan implementation. The total ASQ is derived from the sum of the timber volumes from all NIC's. The NIC's cannot be substituted for each other in the timber sale program.

- **NIC I. Normal Operability:** This is volume scheduled from suitable lands using existing logging systems. Most of these lands are expected to be economic under projected market conditions. On average, sales from these lands have the highest probability of offering a reasonable opportunity for a purchaser to gain a profit from his/her investment and labor. This is the best operable ground.
- **NIC II. Difficult and Isolated Operability:** This is volume scheduled from suitable lands that are available for harvest using logging systems not in common use in Southeast Alaska. Most of these lands are presently considered economically and technologically marginal. Difficult operability in the Project Area would include helicopter yarding distances greater than three-quarters of a mile. Isolated operability stands are extremely difficult and costly to harvest, due to terrain or helicopter yarding distances greater than one mile.

Objectives

The precise steps to be taken and the resources to be used in achieving goals.

Old Growth

Ecosystems distinguished by old trees and related structural attributes. Old-growth forests are characterized by larger tree size, higher accumulations of large dead woody material, multiple canopy layers, different species composition, and different ecosystem function. The structure and function of an old-growth ecosystem will be influenced by its stand size and landscape position and context.

Old-Growth Habitat

Wildlife habitat managed to maintain old-growth forest characteristics through the planning period.

Organic Soils

Soils that contain a high percentage (generally greater than 20 to 30 percent) of organic matter throughout the soil depth.

Partial Cut

Method of harvesting trees where any number of live stems are left standing in any of various spatial patterns. Not clearcutting. Can include seed tree, shelterwood, or other methods.

Patch

A non-linear surface area differing in appearance from its surroundings.

Planning Record

A system that records decisions and activities that result from the process of developing a forest plan, revision, or significant amendment.

Plant Association

Climax plant community type.

Plant Communities

Aggregations of living plants having mutual relationships among themselves and to their environment. More than one individual plant community.

Population Viability

Ability of a population to sustain itself over time. (see viability)

Process Group

A combination of similar stream channel types based on major differences in landform, gradient, and channel shapes.

Productive Old Growth

Old-growth forest capable of producing at least 20 cubic feet of wood fiber per acre per year, or having greater than 8,000 board feet per acre.

Public Participation

Meetings, conferences, seminars, workshops, tours, written comments, responses to survey questionnaires, and similar activities designed and held to obtain comments from the public about Forest Service activities.

Reforestation

The natural or artificial restocking of an area with trees.

Regeneration

The process of establishing a new crop of trees on previously harvested land.

Rehabilitation

Actions taken to protect or enhance site productivity, water quality, or other values.

Reserve Trees

Live or dead trees that are retained for various resource objectives such as wildlife, structural diversity, etc.

Resident Fish

Fish that are not migratory and complete their entire life cycle in freshwater. Fish that are not anadromous and that reside in freshwater on a permanent basis. Resident fish include non-anadromous Dolly Varden char and cutthroat trout.

Resource values

The tangible and intangible worth of forest resources.

Responsible Official

The Forest Service employee who has the delegated authority to make a specific decision.

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Revegetation

The re-establishment and development of a plant cover. This may take place naturally through the reproductive processes of the existing flora or artificially through the direct action of reforestation or reseedling.

Riparian Area

Geographically definable area with distinctive resource values and characteristics that contain elements of aquatic and riparian ecosystems.

Riparian Ecosystem

Land next to water where plants that are dependent on a perpetual source of water occur.

Roads

Specified: Roads usually developed and operated for long-term land and resource management purposes to constant service.

Temporary: For National Forest timber sales, temporary roads are constructed to harvest timber on a one-time basis. These logging roads are not considered part of the permanent Forest transportation network and have stream crossing structures removed, erosion measures put into place, and the road closed to vehicular traffic after harvest is completed.

Roadless Area

An area of undeveloped public land within which there are no improved roads maintained for travel by means of motorized vehicles intended for highway use.

Rotation

The planned number of years (approximately 100 years in Alaska) between the time that a Forest stand is regenerated and its next cutting at a specified stage of maturity.

Salvage Cutting

Cutting primarily to utilize dead/down material resulting from windthrow and scattered poor risk trees that will not be marketable if left in the stand until the next scheduled harvest. Salvage sales must contain more than 50 percent by volume of dead, insect infested, or windthrown timber

Sawlog

That portion of a tree that is suitable in size and quality for the production of dimension lumber collectively known as sawtimber.

Scoping Process

Early and open activities used to determine the scope and significance of a proposed action, what level of analysis is required, what data is needed, and what level of public participation is appropriate. Scoping focuses on the issues surrounding the proposed action, and the range of actions, alternatives, and impacts to considered in an EA or an EIS.

Scrub-Shrub Wetland

Wetlands dominated by woody vegetation less than 20 feet tall. The species include true shrubs, young trees, and trees or shrubs that are small or stunted because of environmental conditions. In Southeast Alaska this includes forested lands where trees are stunted because of poor soil drainage.

Second Growth

Forest growth that has become established following some disturbance such as cutting, serious fire, windthrow, or insect attack; even-aged stands that will grow back on a site after removal of the previous timber stand.

Sediment

Solid material, both mineral and organic, that is in suspension, is being transported, or has been moved from its site of origin by streams or mass movement.

Sensitive Species

Plant and animal species which are susceptible or vulnerable to activity impacts or habitat alterations. Species that are recognized by the regional forester as needing special management to

prevent placement on Federal or state lists.

Seral

Early stage of succession.

Silviculture

The branch of forestry involving the theory and practice of manipulating the establishment, composition, structure, and growth of forest vegetation. Silviculture involves the appropriate application of ecological, social, and economic principles of vegetative management to achieve resource management objectives and desired future forest conditions.

Silvicultural Prescription

A written technical document which provides detailed implementation direction about methods, techniques, timing, and monitoring or vegetative treatments. A prescription is prepared after a preferred treatment alternative has been selected, but before the project is implemented. A prescription is prepared by a silviculturist who uses interdisciplinary input to best achieve established objectives, direction, and requirements for land managed by the USDA Forest Service.

Site Productivity

Production capability of specific areas of land.

Slash

Debris left over after a logging operation; i.e. limbs, bark, broken pieces of logs.

Smolt

Young silvery-colored salmon or trout which move from freshwater streams to saltwater.

Snag

A standing dead tree.

Soil Productivity

The capacity of a soil, in its normal environment, to produce a specific plant or sequence of plants under a specific system of management.

Soil Resource Inventory (SRI)

An inventory of the soil resource based on landform, vegetative characteristics, soil characteristics, and management potentials.

Spawning Area

The available area in a stream course which is suitable for the deposition and incubation of salmon or trout eggs.

Special Habitats

Structural elements of ecosystems. These may include, but are not limited to: snags, spawning gravels, fallen trees, wetlands, aquatic reefs, caves, seeps, and springs.

Species Diversity

The number of different species occurring in a location or under a similar environmental condition.

Split Yarding

The process of separating the direction of timber harvest yarding into opposite directions. Often a stream is used as a dividing line.

Stand (Tree Stand)

An aggregation of trees occupying a specific area and sufficiently uniform in composition, age arrangement, and condition as to be distinguishable from the trees in adjoining areas.

Standard

A course of action or level of attainment required by the forest plan to promote achievement of goals and objectives.

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State Historic Preservation Officer (SHPO)

State appointed official who administers Federal and State programs for cultural resources.

Stocking

The degree of occupancy of land by trees as measured by basal area or number of trees and as compared to a stocking standard; that is, the basal area or number of trees required to fully use the growth potential of the land.

Structural Diversity

The diversity of forest structure, both vertically and horizontally, which provides for a variety of forest habitats such as logs and multi-layered forest canopy for plants and animals.

Stumpage

The value of timber as it stands uncut in terms of dollar value per thousand board feet.

Project Area

The area of the National Forest System controlled by a decision document.

Subsistence

The term "subsistence uses" means the customary and traditional uses by rural Alaska residents of wild renewable resources for direct, personal, or family consumption as food, shelter, fuel, clothing, tools, or transportation; for the making and selling of handicraft articles out of non-edible byproducts of fish and wildlife resources taken for personal or family consumption; and for customary trade.

Subsistence Use Area

Important Subsistence Use Areas include the "most reliable" and "most often hunted" categories from the Tongass Resource Use Cooperative Survey (TRUCS) and from subsistence survey data from ADFG, the University of Alaska, and the Forest Service, Region 10. Important use areas include both intensive and extensive use areas for subsistence harvest of deer, furbearers, and salmon.

Substantive Comment

A comment that provides factual information, professional opinion, or informed judgement germane to the action being proposed.

Substrate

The type of material in the bed (bottom) of rivers and streams.

Succession

The ecological progression of community change over time, characterized by displacements of species leading towards a stable climax community.

Suitability

An evaluation based upon a resource's potential use within proposed management activities.

Suitable Forest land

Forest land for which technology is available that will ensure timber production without irreversible resource damage to soils, productivity, or watershed conditions, and for which there is reasonable assurance that such lands can be adequately restocked, and for which there is management direction that indicated that timber production is an appropriate use of that area.

Sustained Yield

The amount of renewable resources that can be produced continuously at a given intensity of management.

Thinning

The practice of removing some of the trees in a stand so that the remaining trees will grow faster due to reduced competition for nutrients, water, and sunlight. Thinning may also be done to change the characteristics of a stand or wildlife or other purposes. Thinning may be done at two different stages.

Threatened Species

Plant or animal species which is likely to become endangered throughout all or a significant portion of its range within the foreseeable future, as defined in the Endangered Species Act of 1973, and which has been designated in the Federal Register by the Secretary of the Interior as a threatened species. (See also, endangered species, sensitive species.)

Threshold

The point or level of activity beyond which an undesirable set of responses begins to take place within a given resource system.

Timber Classification

Forested land is classified under each of the land management alternatives according to how it relates to the management of the timber resource. The following are definitions of timber classifications used for this purpose.

Nonforest: Land that has never supported forests and land formerly forested where use for timber production is precluded by development or other uses.

Forest: Land at least 10-percent stocked (based on crown cover) by forest trees of any size, or formerly having had such tree cover and not currently developed for nonforest use.

Suitable or suitable available: Land to be managed for timber production on a regulated basis.

Unsuitable: Forest land withdrawn from timber utilization by statute or administrative regulation (for example, wilderness), or identified as inappropriate for timber production in the Forest planning process.

Commercial forest: Forest land tentatively suitable for the production of continuous crops of timber and that has not been withdrawn.

Timber Harvest Unit

A "Timber Harvest Unit" is an area within which Forest Service specifies for harvest all or part of the timber.

Timber Stand Improvement (TSI)

All noncommercial intermediate cutting and other treatments to improve composition, condition, and volume growth of a timber stand.

Tongass Land Management Plan (TLMP)

See Forest Plan

Understory

The trees and shrubs in a forest growing under the canopy or overstory.

Unsuitable Forest Land

Forest land withdrawn from timber utilization by statute or administrative regulation; for example, Wilderness, or identified as not appropriate for timber production in the forest planning process.

Utility Logs

Those logs that do not meet sawlog grade but are suitable for production of firm useable pulp chips.

VAC

See Visual Absorption Capability.

Value Comparison Unit (VCU)

Areas which generally encompass a drainage basin containing one or more large stream systems; boundaries usually follow easily recognizable watershed divides. Established to provide a common set of areas where resource inventories could be conducted and resource interpretations made.

Viable Population

The number of individuals of a species required to ensure the long-term existence of the species in natural, self-sustaining populations adequately distributed throughout their region.

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Viewshed

An expansive landscape or panoramic vista seen from a road, marine water way, or specific viewpoint.

Visual Quality Objectives (VQO)

A desired level of scenic quality and diversity of natural features based on physical and sociological characteristics of an area. Refers to the degree of acceptable alterations of the characteristic landscape.

Preservation: Permits ecological changes only. Applies to wilderness areas and other special classified areas. Management activities are generally not allowed in this setting.

Retention: Provides for management activities that are not visually evident to the casual Forest visitor.

Partial Retention: Management activities remain visually subordinate to the natural landscape.

Modification: Management activities may visually dominate the characteristics landscape. However, activities must borrow from naturally established form-line color and texture so that the visual characteristics resemble natural occurrences within the surrounding area when viewed in the middleground distance.

Maximum Modification: Management activities may dominate the landscape but should appear as a natural occurrence when viewed as background.

V-Notches

A deeply incised valley along some waterways that would look like a "V" from a cross-section. These abrupt changes in terrain features are often used as harvest unit or yarding boundaries.

Volume

Stand volume based on standing net board feet per acre by Scribner Rule.

Volume Strata

Categories of timber volume derived from the timber type data layer (TIMTYP) and the common land unit data layer (CLU). Three volume strata (low, medium, and high) are recognized in the Forest Plan.

Watershed

The area that contributes water to a drainage or stream. Portion of land from which all surface water drains to a common point. Watersheds can range from a few tens of acres that drain a single small intermittent stream to many thousands of acres for a stream that drains hundreds of connected intermittent and perennial streams.

Wetland

Areas that are inundated by surface or groundwater frequently enough to support vegetation that requires saturated or seasonally saturated soil conditions for growth and reproduction. Wetlands generally include: swamps, marshes, bogs, and similar areas such as sloughs, potholes, wet meadows, river overflows, mudflats, and natural ponds.

Wilderness

Areas designated by congressional action under the 1964 Wilderness Act. Wilderness is defined as undeveloped federal land retaining its primeval character and influence without permanent improvements or humans habitation. Wilderness areas are protected and managed to preserve their natural conditions, which generally appear to have been affected primarily by the forces of nature, with the imprint of human activity substantially unnoticeable; have outstanding opportunities for solitude or a primitive and unconfined type of recreation; areas of at least 5,000 acres are of sufficient size to make practical their preservation, enjoyment, and use in an unimpaired condition; and may contain features of scientific, educational, scenic, or historical value as well as ecologic and geologic interest. In Alaska, Wilderness has been designated by ANILCA and TTRA.

Wildlife Analysis Area (WAA)

A division of land used by the Alaska Department of Fish and Game for wildlife analysis and harvest statistics.

Wildlife Habitat

The locality where a species may be found and where the essentials for its development and sustained existence are obtained.

Windfirm

Trees that have been exposed to the wind throughout their life and have developed a strong root system or trees that are protected from the wind by terrain features.

Windthrow

The act of trees being uprooted by the wind. In Southeast Alaska, Sitka spruce and hemlock trees are shallow rooted and susceptible to windthrow. There generally are three types of windthrow:

Endemic: where individual trees are blown over;

Catastrophic: where a major windstorm can destroy hundreds of acres; and

Management Related: where the clearing of trees in an area make the adjacent standing trees vulnerable to windthrow.

Winter Range

An area, usually at lower elevation, used by big game during the winter months; usually smaller and better defined than summer ranges.

Yarding

Moving timber from the stump to a collection point done with helicopter, cable or shovels.

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4 Lists

APPENDICIES

Appendix A	Unit Cards
Appendix B	Road Card
Appendix C	Monitoring and Improvement Projects
Appendix D	Reasons for Scheduling the Environmental Analysis
Appendix E	Mitigation Measures

Appendix A

Unit Cards and Maps

Harvest Prescriptions

The prescriptions provided on the unit cards are intended to meet the objectives listed on the cards. Almost all harvest prescriptions proposed for the Doughnut project would require retaining some trees in clumps or dispersed through all or a portion of harvest units to maintain visual quality objectives and biodiversity. This strategy is consistent with the Forest Plan objective of reducing clearcutting in Modified Landscape management prescription areas, when other methods will meet land management objectives. If large enough, reserve clumps would help meet the desire to provide seed sources to eventually recolonize areas where forbs and shrubs have been shaded out by dense second growth. Reserve clumps and dispersed trees would provide a component of large trees in regenerating stands that would provide habitat for cavity nesting birds, denning bears, marten, marbled murrelets and other species associated with large trees. Where safety permits, reserve trees would include large standing snags, as well as green trees. The reserve trees would be retained in the units throughout the rotation.

Appendix G of the Forest Plan FEIS (USDA 1997b) contains information on silvicultural systems used on the Tongass. The appendix classifies the various prescriptions into three basic regeneration methods; even-aged, two-aged and uneven-aged. (Table G-2 of Appendix G). Even-aged methods include clearcutting with less than 10% reserves or cutting patches larger than 2 acres. Two-aged methods include clearcuts with more than 10% reserves or overstory removal with reserves. Uneven-aged methods include group selection and single tree selection.

The six basic harvest prescriptions used for the Doughnut project are described as:

Even-aged Methods

1. Patch Cuts (PC): clearcuts ranging from 2 to 10 acres, yarded by helicopter. All trees meeting contract specifications are cut and removed. Generally, there are no trees retained within harvest units. Damage to residuals trees may occur in or adjacent to the units.
2. Clearcuts With <15% Retention (CC): clearcuts larger than 10 acres, yarded by cable or helicopter, with less than 15% of the trees and/or acreage left in reserve clumps or scattered throughout the unit. Generally, reserves are clumped, with few individual trees retained within harvest units. Damage to residuals trees may occur in or adjacent to the units.

Two-aged Methods

3. Clearcuts With Reserves (CC): clearcuts larger than 10 acres, yarded by cable or helicopter, with more than 15% of the trees and/or acreage left in reserve clumps or scattered throughout the unit. Damage to residuals trees may occur in or adjacent to the units.

Uneven-aged Methods

4. Group Selections (GS): harvest units are no larger than 2 acres, yarded by helicopter. All trees meeting contract specifications are cut and removed. Generally, there are no trees retained within harvest units. Damage to residuals trees may occur in or adjacent to the units.
5. Partial Harvest using a combination of Overstory Removal, Group Selection and Individual Tree Marking to harvest 25% to 35% of the merchantable trees in the original stand (IG): harvest units can be any acreage, yarded by helicopter, with 65% to 75% of the basal area and/or trees and/or acreage left in reserve clumps or scattered throughout the unit. Damage to residuals trees may occur in or adjacent to the units.

Over the rotation, clearcuts and overstory removal units would be entered once. Residual trees in these stands would be left as a legacy until the end of the rotation, or possibly be removed during a

commercial thinning of the regenerated stand. Patch cuts and group selections would have the unit re-entered 2-4 times during a rotation, to harvest additional patches or groups. These entries would be spaced out over the rotation, with the result being 2-5 distinct age classes developing within the unit. An initial partial harvest entry (such as Alt. 5) would not be considered a regeneration harvest, and we would anticipate limited natural regeneration. We do anticipate increased growth on residual trees as a result of opening the canopy. Partial harvest units would have a second entry at approximately 1/3 the rotation age to remove more of the overstory and create enough openings to enhance regeneration under the remaining canopy. A third entry might occur 2/3 into the rotation to remove the remaining overstory and promote growth in the understory. Some legacy of large trees would probably be left, even after the third entry.

Doughnut Timber Sale**Unit Number 4****Unit Acres 26**Volstrata Acres Low 0Medium 16High 10Net Volume (MBF/Acre) 23 MBF**Unit Development & Stand Description**

Species composition is 55% western hemlock, 10% Sitka spruce, and 35% yellow-cedar. **Alternative 2** retains 75% of trees throughout the unit. Unit is located between 800 and 1500 feet in elevation on 40%-70% slopes. Stand aspect is south and southeast. There has been no management in the stand. **Alternatives 3, 5, and 6** retain 15% of trees scattered throughout the unit and in clumps. Residual stand will have multiple age classes in alt 2 with all species currently present. Under **alts 3, 5, and 6**, the future stand will be predominately even aged. Logs would be helicopter yarded to a landing on Department of Natural Resources land.

	<u>Alt. 2</u>	<u>Alt. 3, 5, & 6</u>
Treatment	Individual tree and Group	Clearcut with Reserves
Percentage of Retention (TPA)	75%	15%
Leave trees for Marten	Yes	Yes
Harvest Acres	7	23
Harvest Volume (MBF)	201	490
Cable Logging System Acres	0	0
Helicopter Logging System Acres	26	26
Yarded To	DNR Landing 1	DNR Landing 1

Stand Management Objectives:

Alternatives 3, 5, and 6 future stand will be predominately even-aged to two-aged and have two canopy layers. Under **alternative 2** future stand will be uneven-aged. Trees are being retained to meet visual quality objectives, and to provide structure for wildlife. Small diameter, windfirm trees, and at least 7 trees > 20 inches DBH per acre will be retained within areas of high volume strata through the next rotation. Harvest under **alternative 2** is expected to leave a stocked stand and is not a regeneration harvest therefore no future treatments are anticipated until the next entry. Natural regeneration is expected under **alternatives 3, 5, and 6** possible future treatments include planting of spruce or yellow cedar, pre-commercial thinning at age 20-30 years to 110-180 trees per acre.

Water Quality Fisheries

Concern: Unit is located in Hermit Creek watershed.

Mitigation: Unit boundary was modified to exclude all potential tributaries to Hermit Creek (BMP 12.1).

Soils

Concern: No concern

Mitigation:

Wildlife

Concern: High value marten habitat; deer use areas; raptor sightings

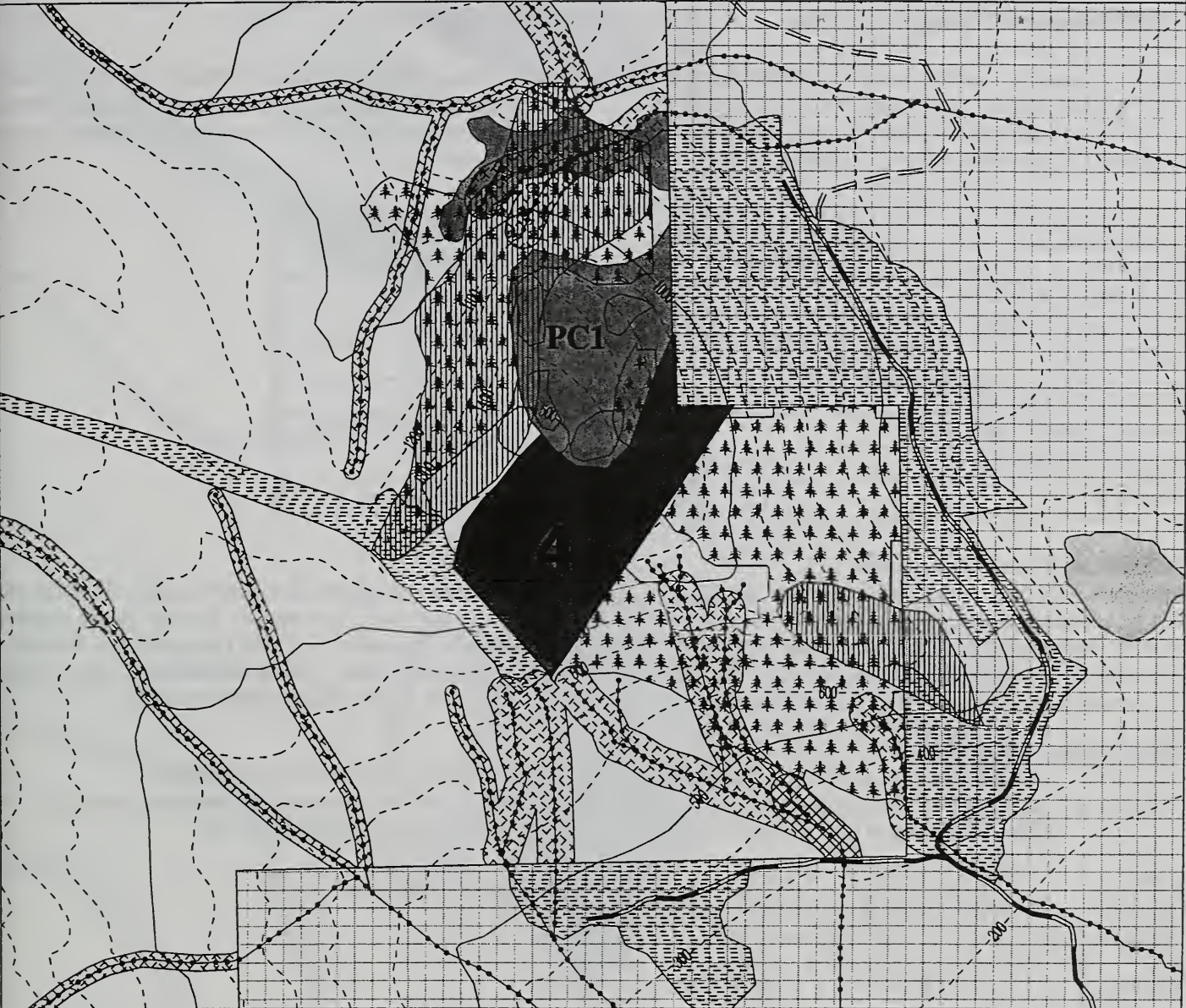
Mitigation: Retain 7 trees >20 inches DBH (4 live trees and 3 decadent) and 3 pieces of downed material with >20" dbh per acre to meet marten standards. High deer use areas are maintained within adjacent habitats including the Old Growth Reserve. Apply no-harvest nest buffers if any raptor nests are located. Avoid continuous disturbance around known nest sites.

Visuals

Concern: A portion of this unit is visible from the Eastern Passage and Mill Creek Viewpoints. Meet the Partial Retention VQO.

Mitigation: In Alternative 2, the 75% retention prescription will alleviate visual concerns. In Alternatives 3 and 5, concentrate the proposed 15% retention in the visible portion of the unit.

Mitigation Measures: F11, T1, T2, W1, W4, W6, W7, W8, W10, W11, W12, W13, W16, W17, W21, W22, W28, W33, H1, H2, H3, V1, V4, V6, V7, and V8



	Class I Stream		Eagle Nest Tree		Proposed cut unit
	Class II Stream		Riparian Buffer		Adjacent proposed units
	Class III Stream		TTRA Buffer		Marten Guidelines Apply
	Class IV Stream		High Hazard Soil		State or Private Land
	Existing Road		Planned State Units		Existing Harvest Unit
	Proposed USFS Road				Saltwater and Lakes
	Planned State Road				1/4 Mile Eagle Nest Buffer

Scale: 1 inch = 1000 feet

Last Updated: March 27, 2000

Alternative	Prescription	Retention	Harvest System	Comments
2	ITM & Group Select	75	Helicopter	No new road
3	Clearcut w/reserves	15	Helicopter	No new road
5 6	Clearcut w/reserves	15	Helicopter	

Unit Development & Stand Description

Species composition is 75% hemlock, 20% spruce and 5% yellow cedar. Stand is located between 700 and 1000 feet in elevation on 25%-65% slopes. Stand aspect is north. There has been no management in the stand. In **alternatives 3, 5, and 6** 10% of the stand will be retained throughout the unit, **alternative 2** will retain 75%. Residual stand will have all species currently present. Logs will be helicopter yarded to a landing on Department of Natural Resources land.

	<u>Alt. 2</u>	<u>Alt. 3, 5, & 6</u>
Treatment	Individual tree and Group	Clearcut w/ Reserves
Percentage of Retention	75%	10%
Leave trees for Marten	Yes	Yes
Harvest Acres	3	10
Harvest Volume (MBF)	125	225
Cable Logging System Acres	0	0
Helicopter Logging System Acres	10	10
Yarded To	DNR Landing 1	DNR Landing 1

Stand Management Objectives:

Alternatives 3, 5, & 6 stand will be predominately even-aged. Trees are being retained to meet marten standards. Retained trees will be windfirm and expected to remain throughout the rotation. Natural regeneration is expected. Possible future treatments include planting of spruce or yellow cedar, pre-commercial thinning at age 20-30 years to 110-180 trees per acre. Harvest will favor the regeneration of the less shade tolerant species of Sitka spruce and yellow cedar. Under **alternative 2** future stand will be uneven-aged. Trees are being retained to meet visual quality objectives, and to provide structure for wildlife.

Water Quality Fisheries

Concern: Unit adjacent to Coal Creek (Class III/HC6). Unit contains Class IV tributaries to Coal Creek

Mitigation: Unit boundary provides side-slope buffer on Class III stream. Provide full suspension wherever possible across Class IV streams; at least partial suspension is required. (BMPs 12.6, 12.6a, 13.9, 13.16)

Soils

Concern: Steep; slide prone slopes along back line.

Mitigation: Locate boundary below steep pitch.

Wildlife

Concern: High value marten habitat; wildlife corridor value

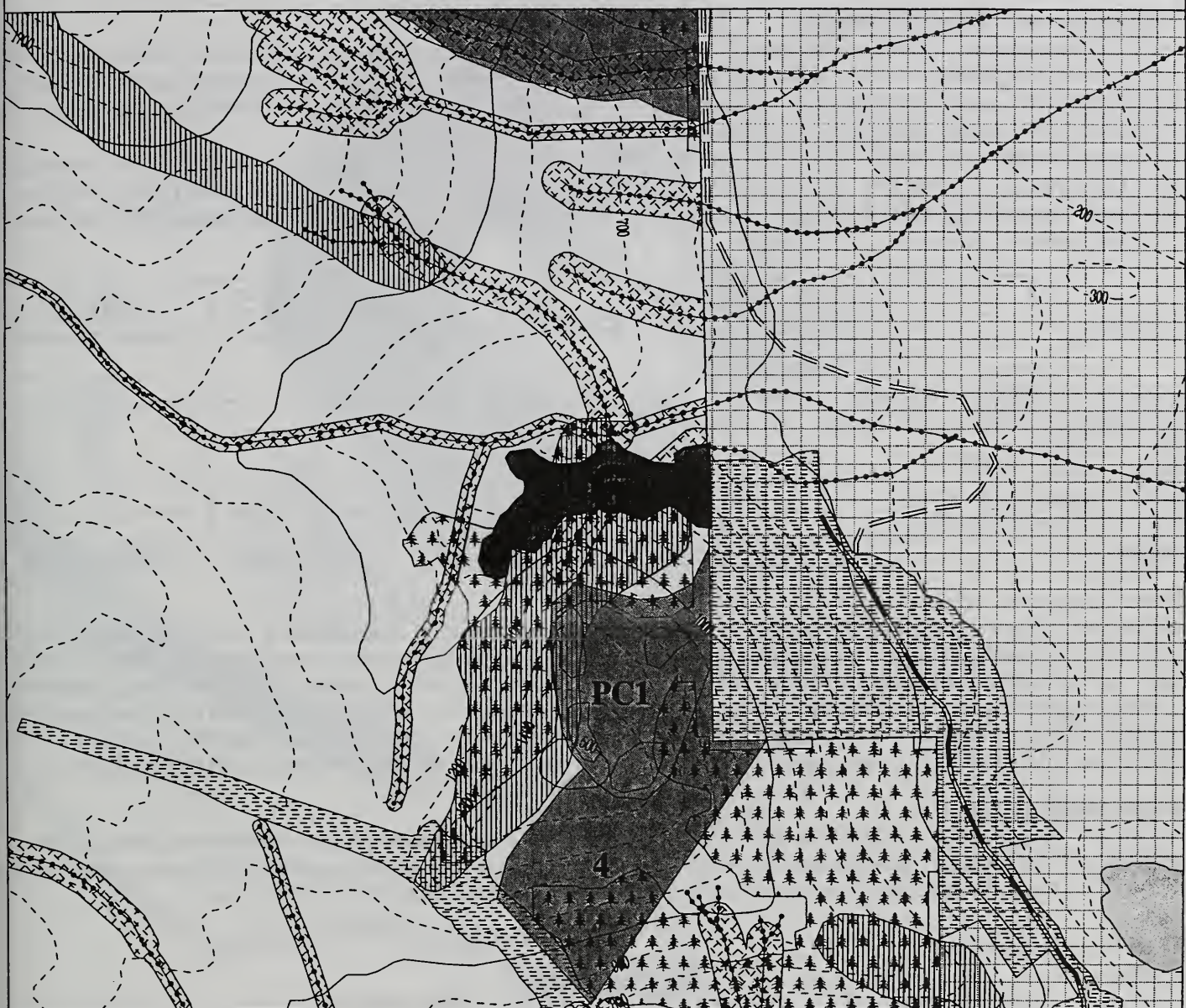
Mitigation: Retain 7 trees >20 inches DBH (4 live trees and 3 decadent) and 3 pieces of downed material with >20" dbh per acre to meet marten standards. Linear shape of unit and stream buffer will retain corridor values

Visuals

Concern: Unit 6 is visible from the Eastern Passage and Mill Creek Viewpoints. Meet the Partial Retention VQO.

Mitigation: The small size of this unit will help to alleviate visual concerns. Avoid clumping retention trees as much as possible.

Mitigation Measures: F1, F2, F3, F11, F15, F18, T1, T2, W1, W4, W6, W7, W8, W13, W16, W17, W21, W22, W28, W33, H1, H2, H3, V1, V4, V6, V7, and V8



<div><div><div> Class I Stream</div><div> Class II Stream</div><div> Class III Stream</div><div> Class IV Stream</div><div> Existing Road</div><div> Proposed USFS Road</div><div> Planned State Road</div></div><div><div> Eagle Nest Tree</div><div> Riparian Buffer</div><div> TTRA Buffer</div><div> High Hazard Soil</div><div> Planned State Units</div></div><div><div> Proposed cut unit</div><div> Adjacent proposed units</div><div> Marten Guidelines Apply</div><div> State or Private Land</div><div> Existing Harvest Unit</div><div> Saltwater and Lakes</div><div> 1/4 Mile Eagle Nest Buffer</div></div></div> <div><div>Scale: 1 inch = 1000 feet</div><div>Last Updated: March 27, 2000</div></div>				
Alternative	Prescription	Retention	Harvest System	Comments
2	ITM & Group Select	75	Helicopter	No new road
3	Clearcut w/reserves	10	Helicopter	No new road
5 6	Clearcut w/reserves	10	Helicopter	No new road

Doughnut Timber Sale**Unit Number 9A****Unit Acres 25**

Volstrata Acres

Low 3

Medium 9

High 13

Net Volume (MBF/Acre) 27 MBF

Unit Development & Stand Description

Species composition is 58% western hemlock, 20% spruce, 20% yellow-cedar, and 2% western red cedar. There has been no management in the stand. Unit is located at 500 to 1000 feet above sea level on 20 to 55% slopes. Stand aspect is primarily east. Dwarf mistletoe is present but not severe. All alternatives would yard the volume to landings on DNR land. Alternatives 2 and 3 use all helicopter yarding. Alternatives 4, 5, and 6 use all cable yarding.

Alternative 2 retains 75% of the existing trees throughout the unit. **Alternative 3** retains 10% of the existing trees throughout the unit. **Alternatives 4, 5** retain 10% and **Alternative 6** retains - 25% of trees. Trees will be retained along yarding breaks or clumped to accommodate cable operations. Logs would be cable yarded to a proposed road constructed on DNR land adjacent to National Forest.

	<u>Alt. 2</u>	<u>Alt. 3</u>	<u>Alts. 4 & 5</u>	<u>Alt. 6</u>
Treatment	Individual tree and group selection	Clearcut w/reserves	Clearcut w/reserves	Clearcut w/reserves
Percentage of Retention	75%	10%	10%	25%
Leave trees for Marten	Yes	Yes	Yes	Yes
Harvest Acres	6	25	25	20
Harvest Volume (MBF)	234	608	608	574
Cable Logging System Acres	0	0	25	25
Helicopter Logging System Acres	25	25	0	0
Yarded To	DNR Landing 2	DNR Landing 2	Proposed Road	Proposed Road

Stand Management Objectives:

Alternative 2: Future stand would be uneven-aged with multiple canopy layers. Approximately 75% of the trees per acre would be left to meet visual objectives. **Alternatives 3, 4, 5:** Future stand will be predominantly even-aged. **Alternative 6** will be two aged. All alternatives will retain a component of the overstory into the next rotation to meet wildlife and visual objectives. Large diameter, windfirm trees will be retained through the rotation. Alternatives 3, 4, 5, and 6 are expected to regenerate naturally. Possible future treatments include planting of spruce or yellow cedar, pre-commercial thinning at age 20-30 years to 110-180 trees per acre. Alternative 2 is not a regeneration harvest and no future treatments are anticipated until the next entry.

Water Quality Fisheries

Concern: Unit adjacent to Mom's Creek tributary (Class III/HC6). Unit contains Class IV tributaries to Mom's Creek

Mitigation: Unit boundary provides side-slope buffer on Class III stream. Provide full suspension wherever possible across Class IV streams; at least partial suspension is required. (BMPs 12.6, 12.6a, 13.9, 13.16)

Soils

Concern: No concern

Wildlife

Concern: High value marten habitat; game trails; bedding areas; eagle nest on State land.

Mitigation: Retain 7 trees >20 inches DBH (4 live trees and 3 decadent) and 3 pieces of downed material with 20" dbh per acre to meet marten standards. More retention in 9B will provide structure and cover for wildlife. Avoid continuous helicopter disturbance within ¼ mile of an active eagle nest.

Visuals

Concern: Units 9A, 9B, and 9C are visible from the Eastern Passage and Mill Creek Viewpoints. In Alternatives 2, 3, 5, and 6, Unit 9A is directly adjacent to Unit 9B, which is directly adjacent to Unit 9C, creating a large overall opening (102 acres). Meet the Partial Retention VQO.

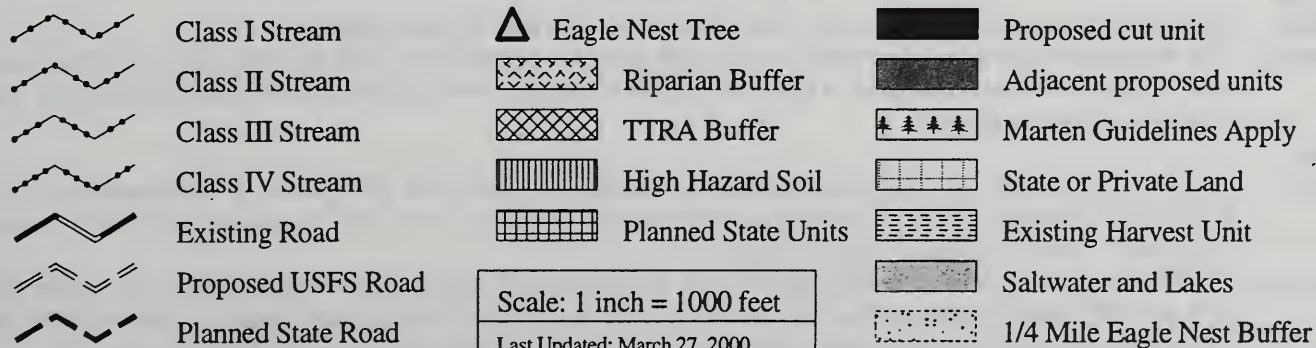
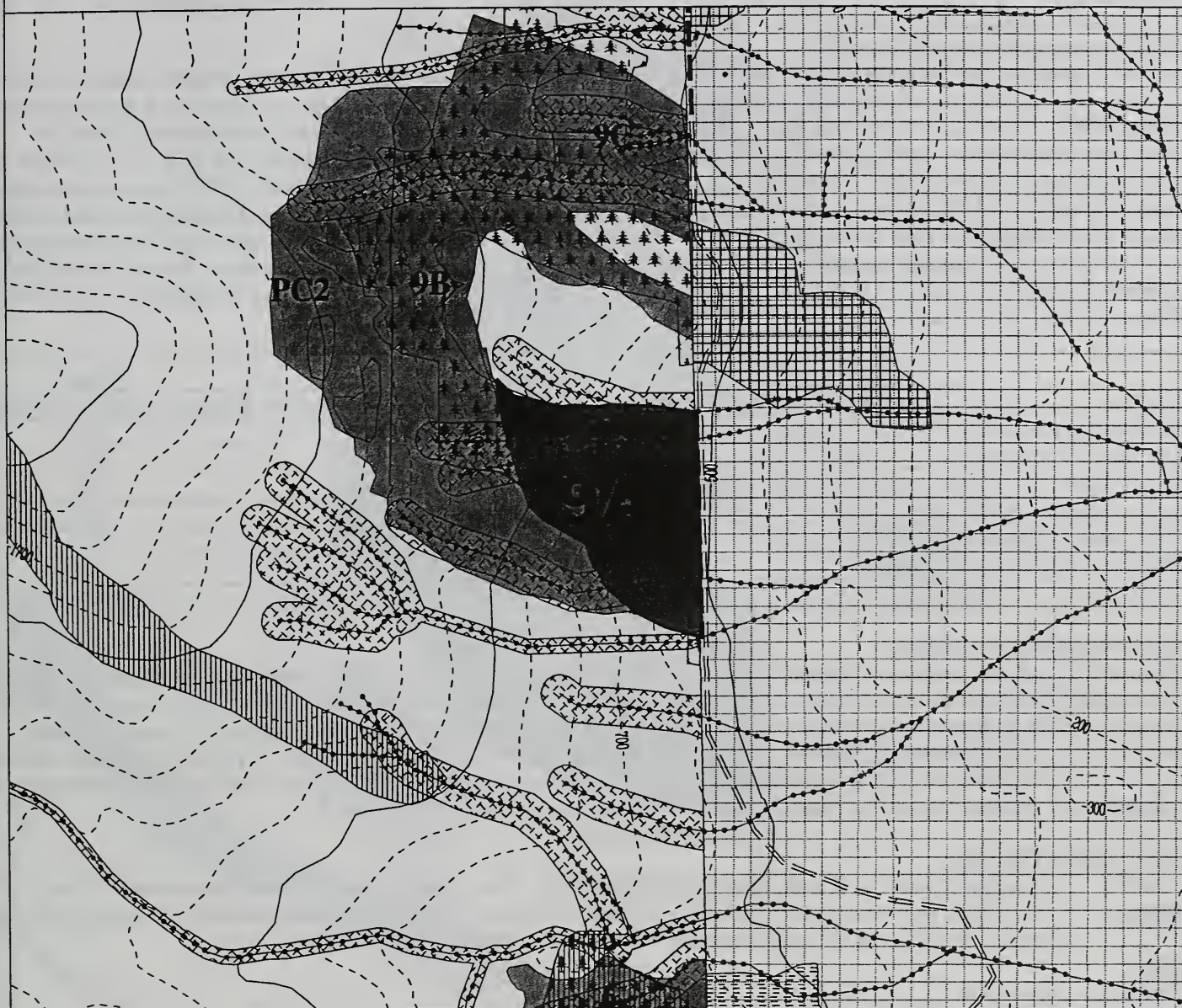
Mitigation: The 75% retention proposed in Alternative 2 for 9A, 9B, and 9C alleviates visual concerns. In Alternatives 3 and 5, the 10% retention proposed in Units 9A and 9C should be evenly distributed throughout the unit. The 50% retention proposed in Unit 9B will help to "break up" the appearance of a large opening. In Alternative 4, Units 9A and 9C will stand alone, with 10% retention proposed for both. The retention in these units should be evenly distributed. In Alternative 6, the proposed retention of 25% in Units 9A and 9C, and 75% retention proposed in Unit 9B should help alleviate visual concerns. In all three units, distribute the retention to avoid the appearance of a large opening.

Mitigation Measures: F1, F2, F3, F11, F18, T1, T2, W1, W4, W6, W7, W8, W13, W16, W17, W21, W22, W28, W33, H1, H2, H3, V1, V4, V6, V7, and V8

25 ACRES

ALTERNATIVE 2 3 4 5 6

UNIT 9A



Alternative	Prescription	Retention	Harvest System	Comments
2	ITM & Group Select	75	Helicopter	No new road
3	Clearcut w/reserves	10	Helicopter	No new road
4 5	Clearcut w/reserves	10	Cable	
6	Clearcut w/reserves	25	Cable	

Doughnut Timber SaleVolstrata Acres Low 5Medium 23**Unit Number 9B**High 32**Unit Acres 61**Net Volume (MBF/Acre) 25 MBF**Unit Development & Stand Description**

Species composition is 55% hemlock, 20% spruce and 25% yellow cedar. Stand consists of mostly decadent western hemlock with larger spruce occurring throughout the stand. Yellow cedar becomes more abundant above 900 feet and is prevalent in small patches along the backline and southern side of the unit. The upper southwest edge of the unit, approximately 8 acres, is characterized as an area of yellow cedar decline. Unit is located at 700 to 1300 feet above sea level on 30% to 70% slopes. Stand aspect is primarily east-northeast. Dwarf mistletoe is present but not severe. **Alternative 2** retains 75% of the trees throughout the unit. Logs would be helicopter yarded to a landing on Department of Natural Resources land. **Alternatives 3 and 5** retain 50% of the existing trees. Reserve trees would be scattered throughout the unit and in clumps. Logs would be helicopter yarded to a landing on Department of Natural Resources land. **Alternative 6** retains 75% of the existing trees. Reserve trees would be scattered throughout the unit and in clumps. Logs would be yarded by helicopter to proposed road constructed on DNR land adjacent to National Forest.

	<u>Alt. 2</u>	<u>Alt. 3 & 5</u>	<u>Alts. 6</u>
Treatment	Individual & group selection	Diameter Limits w/exclusions	Diameter Limits w/exclusions
Percentage of Retention	75%	50%	75%
Leave trees for Marten	Yes	Yes	Yes
Harvest Acres	21	37	31
Harvest Volume (MBF)	610	924	665
Cable Logging System Acres	0	0	0
Helicopter Logging System Acres	61	61	61
Yarded To	DNR Landing 2	DNR Landing 2	Proposed Road

Stand Management Objectives:

Alternative 2 and Alternative 6: Future stand would be uneven-age with multiple canopy layers. Assure all pre-harvest species are represented in the stand after first entry. Approximately 75% of the trees per acre would be left to meet visual objectives.

Alternatives 3 & 5: Future stand will be two-aged leading towards uneven aged with canopy layers consisting of smaller diameter trees and dominant trees. Smaller diameter trees will be retained for visual objectives. A portion of the large diameter trees retained will provide for future harvest while a majority of these larger trees over 20 inches DBH will remain throughout the rotation to meet wildlife objectives. Natural regeneration is expected in alternatives 3 and 5.

Water Quality Fisheries

Concern: Unit adjacent to Mom's Creek tributary (Class III/HC6). Unit contains Class IV tributaries to Mom's Creek.

Mitigation: Unit boundary provides side-slope buffer on Class III stream. Provide full suspension wherever possible across Class IV streams; at least partial suspension is required. (BMPs 12.6, 12.6a, 13.9, 13.16)

Soils

Concern: No concern

Wildlife:

Concern: High value marten habitat; game trails; corridor values, eagle nest on State land.

Mitigation: 50% retention or higher will maintain structure and cover for wildlife along with corridor values. Partial harvest units in upper elevations designed to maintain wildlife corridors. Avoid continuous helicopter disturbance within ¼ mile of any active eagle nests.

Visuals

Concern: Units 9A, 9B, and 9C are visible from the Eastern Passage and Mill Creek Viewpoints. In **Alternatives 2, 3, 5, and 6**, Unit 9A is directly adjacent to Unit 9B, which is directly adjacent to Unit 9C, creating a large overall opening (102 acres). Meet the Partial Retention VQO.

Mitigation: The 75% retention proposed in **Alternative 2** for 9A, 9B, and 9C will alleviate visual concerns. In **Alternatives 3 & 5**, the 10% retention proposed in Units 9A and 9C should be evenly distributed throughout the unit. The 50% retention proposed in Unit 9B in these alternatives will "break up" the appearance of a large opening. In **Alternative 4**, Units 9A and 9C will stand alone, with 10% retention proposed for both. The retention in these units should be evenly distributed. In **Alternative 6**, the proposed retention of 25% in Units 9A and 9C, along with the 75% retention proposed in Unit 9B should alleviate visual concerns. In all three units, distribute the retention evenly to avoid the appearance of a large opening.

Mitigation Measures: F1, F2, F3, F11, F18, F19, T1, T2, W4, W6, W7, W8, W13, W16, W17, W21, W22, W28, W33, H1, H2, H3, V4, V6, V7, and V8

Doughnut Timber Sale**Unit Number 9C****Unit Acres 16**Volstrata Acres Low 3 Medium 7 High 5Net Volume (MBF/Acre) 22 MBF**Unit Development & Stand Description**

Species composition is 60% hemlock, 20% spruce and 20% yellow cedar. There has been no management in the stand. Stand consists of mostly decadent western hemlock with spruce and yellow cedar occurring throughout the stand. Yellow cedar is more abundant in the upper portions of the unit and along the north sideline. Unit is located at 500 to 800 feet above sea level on generally gradual slopes of 20 to 50%. Stand aspect is primarily east-northeast. Dwarf mistletoe is present but not severe.

Alternative 2 retains 75% of the trees throughout the unit. Logs would be helicopter yarded to a landing on Department of Natural Resources land. **Alternative 3** retains 10% of the existing trees throughout the unit. Logs will be helicopter yarded to a landing on Department of Natural Resources land. **Alternatives 4 & 5** retain 10% of the existing trees. **Alternative 6** retains 25% of trees. In **Alts 4, 5, & 6** trees will be retained along yarding breaks or clumped to accommodate cable operations. Logs would be cable yarded to proposed road, constructed on DNR land adjacent to National Forest.

	<u>Alt. 2</u>	<u>Alt. 3</u>	<u>Alts. 4 & 5</u>	<u>Alts. 6</u>
Treatment	Individual tree and group selection	Clearcut w/reserves	Clearcut w/reserves	Clearcut w/reserves
Percentage of Retention	75%	10%	10%	25%
Leave trees for Marten	Yes	Yes	Yes	Yes
Harvest Acres	6	16	16	13
Harvest Volume (MBF)	123	317	317	299
Cable Logging System Acres	0	0	16	16
Helicopter Logging System Acres	16	16	0	0
Yarded To	DNR Landing 2	DNR Landing 2	Proposed Road	Proposed Road

Stand Management Objectives:

Alternative 2: Future stand will be uneven-aged with multiple canopy layers. Approximately 75% of the trees per acre would be left to meet visual objectives. Retention would allow for multiple entries throughout the rotation. **Alternatives 3, 4, and 5:** Future stand will be predominantly even-aged. Trees retained will remain throughout the rotation meeting visual and wildlife objectives. Natural regeneration is expected. Pre-commercial thinning at age 20-30 years to 110-180 trees per acre. **Alternatives 6** Future stand will be even-aged tending towards two aged. Natural regeneration is expected.

Water Quality Fisheries

Concern: Unit adjacent to Mom's Creek tributary (Class III/HC6). Unit contains Class IV tributaries to Mom's Creek

Mitigation: Unit boundary provides side-slope buffer on Class III stream. Provide full suspension wherever possible across Class IV streams; at least partial suspension is required. (BMPs 12.6, 12.6a, 13.9, 13.16)

Soils

Concern: No concern

Wildlife

Concern: High value marten habitat. Eagle nest on State land.

Mitigation: Retain 7 trees >20 inches DBH (4 live trees and 3 decadent) and 3 pieces of downed material with >20"dbh per acre to meet marten standards. More retention in 9B will provide structure and cover for wildlife. Avoid continuous helicopter disturbance within ¼ mile of any active eagle nests.

Visuals

Concern: Units 9A, 9B, and 9C are visible from the Eastern Passage and Mill Creek Viewpoints. In Alternatives 2, 3, 5, and 6, Unit 9A is directly adjacent to Unit 9B, which is directly adjacent to Unit 9C, creating a large overall opening (102 acres). Meet the Partial Retention VQO.

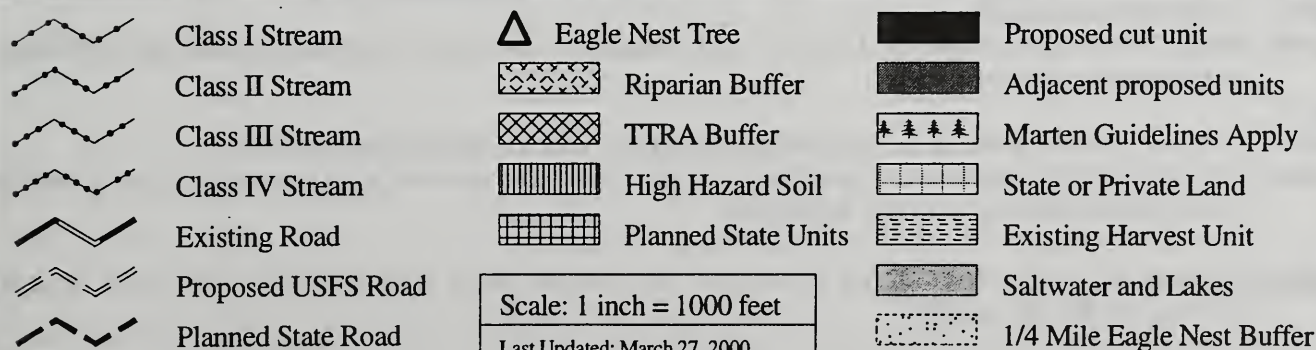
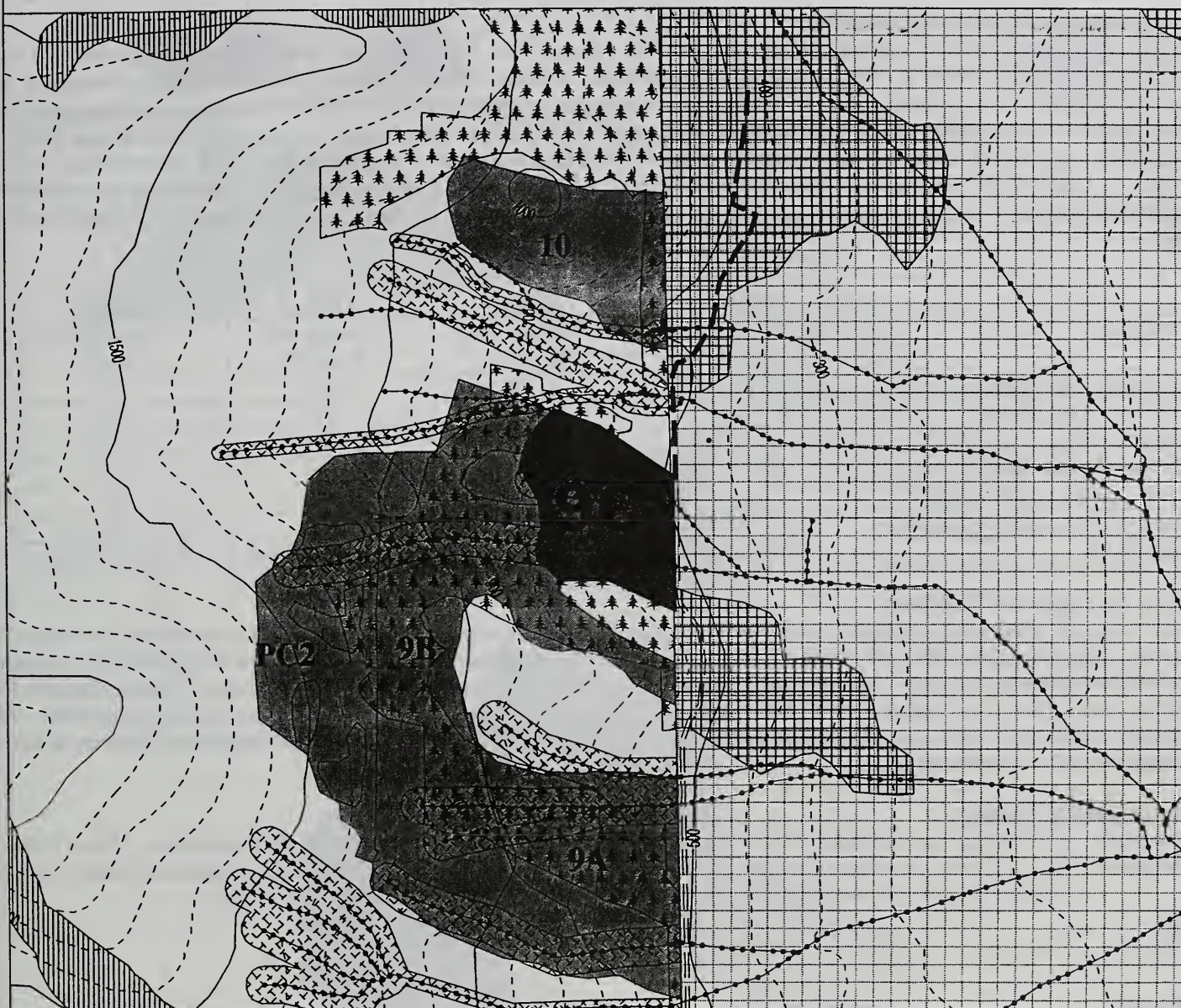
Mitigation: The 75% retention proposed in **Alternative 2** for the 3 units (9A, 9B, and 9C) will alleviate visual concerns. In **Alternatives 3 and 5**, the 10% retention proposed in Units 9A and 9C should be evenly distributed throughout the unit. The 50% retention proposed in Unit 9B in these alternatives will help to "break up" the appearance of a large opening. In **Alternative 4**, Units 9A and 9C will stand alone, with 10% retention proposed for both. The retention in these units should be evenly distributed as much as possible. In **Alternative 6**, the proposed retention of 25% in Units 9A and 9C, along with the 75% retention proposed in Unit 9B should help alleviate visual concerns. In all three units, distribute the retention evenly to avoid the appearance of a large opening.

Mitigation Measures: F1, F2, F3, F11, T1, T2, W1, W4, W6, W7, W8, W13, W16, W17, W21, W22, W28, W33, H1, H2, H3, V1, V4, V6, V7, and V8

16 ACRES

ALTERNATIVE 2 3 4 5 6

UNIT 9C



Scale: 1 inch = 1000 feet

Last Updated: March 27, 2000

Alternative	Prescription	Retention	Harvest System	Comments
2	ITM & Group Select	75	Helicopter	No new road
3	Clearcut w/reserves	10	Helicopter	No new road
4 5	Clearcut w/reserves	10	Cable	
6	Clearcut w/reserves	25	Cable	

Doughnut Timber Sale**Unit Number 10****Unit Acres 20**Volstrata Acres Low 0Medium 16High 10Net Volume (MBF/Acre) 23 MBF**Unit Development & Stand Description**

Species composition is 43% hemlock, 22% spruce and 35% yellow cedar. There has been no management in the stand. Stand has a relatively high number of dead, mature yellow cedar trees. Average DBH for the yellow cedar trees is approximately 18-20 inches. Western hemlock is common as co-dominants and prevalent in smaller diameter classes. Spruce occurs throughout the unit. Unit is located at 600 to 1100 feet above sea level on 30 to 65% slopes. Stand aspect is primarily east-southeast. Dwarf mistletoe is present but not severe. **Alternative 2** retains 75% of the existing trees throughout the unit. Logs would be helicopter yarded to a landing on Department of Natural Resources land. **Alternatives 3, 5, & 6** retain 15% of the existing trees. Reserve trees would be scattered throughout the unit. Logs would be helicopter yarded to a landing on Department of Natural Resources land.

	<u>Alt. 2</u>	<u>Alt. 3</u>	<u>Alts. 5</u>	<u>Alts. 6</u>
Treatment	Individual tree and group selection	Clearcut with Reserves	Clearcut with Reserves	Clearcut with Reserves
Percentage of Retention	75%	15%	15%	15%
Leave trees for Marten	Yes	Yes	Yes	Yes
Harvest Acres	20	20	20	20
Harvest Volume (MBF)	189	459	459	459
Cable Logging System Acres	0	0	0	0
Helicopter Logging System Acres	20	20	20	20
Yarded To	DNR Landing 2	DNR Landing 2	Proposed Road	Proposed Road

Stand Management Objectives:

Alternative 2: Future stand will be uneven-age with multiple canopy layers. Dead and dying yellow cedar will be targeted for harvest. Approximately 75% of the trees per acre would be left to meet visual objectives. Retention would allow for multiple entries throughout the rotation. **Alternatives 3, 5, and 6:** Future stand will be predominantly even-age. Smaller diameter trees will be retained for visual objectives. A small number of large diameter trees will be retained to meet wildlife objectives. Trees retained in this entry will remain throughout the rotation. Natural regeneration is expected. Pre-commercial thinning at age 20-30 years to 110-180 trees per acre.

Water Quality Fisheries

Concern: Unit adjacent to Mom's Creek tributary (Class III/HC6). Unit may contain Class IV tributaries to Mom's Creek.

Mitigation: Unit boundary provides side-slope buffer on Class III stream. Provide full suspension wherever possible across Class IV streams; at least partial suspension is required. (BMPs 12.6, 12.6a, 13.9, 13.16).

Soils

Concern: No concern

Wildlife

Concern: High value marten habitat

Mitigation: Retain 7 trees >20 inches DBH (4 live trees and 3 decadent) and 3 pieces of downed material with >20"dbh per acre to meet marten standards.

Visuals

Concern: This unit is visible from the Eastern Passage Viewpoint. Meet the Partial Retention VQO.

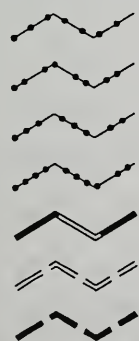
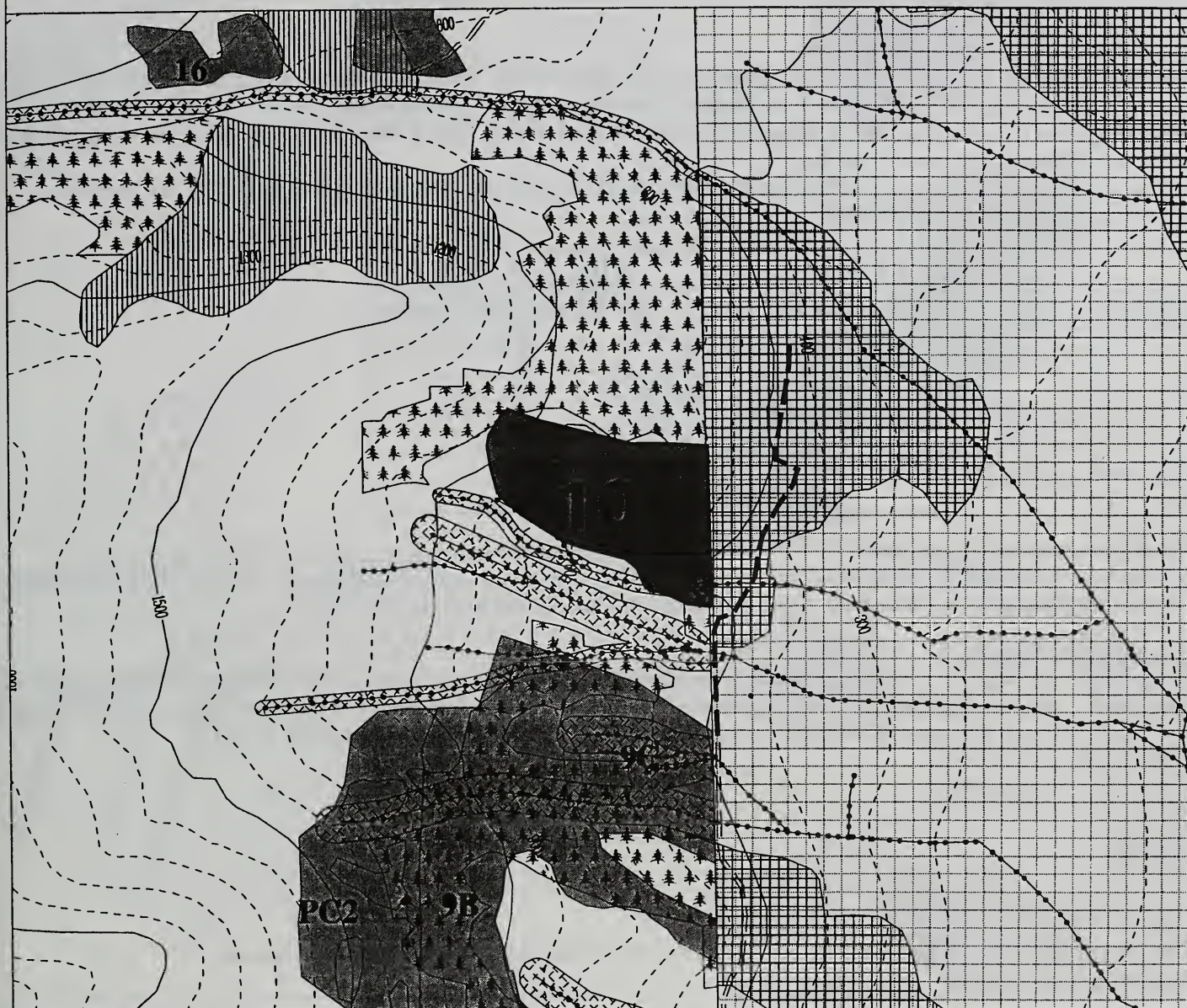
Mitigation: The 75% retention proposed in Alternative 2 will alleviate visual concerns. In Alternatives 3, 5, and 6, distribute the 15% proposed retention as evenly as possible.

Mitigation Measures: F1, F2, F3, F11, F18, T1, T2, W1, W4, W6, W7, W8, W13, W16, W17, W21, W22, W28, W33, H1, H2, H3, V1, V4, V6, V7, and V8

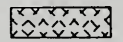
20 ACRES

ALTERNATIVE 2 3 5 6

UNIT 10



Eagle Nest Tree



Riparian Buffer



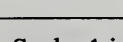
TTRA Buffer



High Hazard Soil



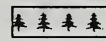
Planned State Units



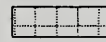
Proposed cut unit



Adjacent proposed units



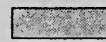
Marten Guidelines Apply



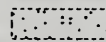
State or Private Land



Existing Harvest Unit



Saltwater and Lakes



1/4 Mile Eagle Nest Buffer

Scale: 1 inch = 1000 feet

Last Updated: March 27, 2000

Alternative	Prescription	Retention	Harvest System	Comments
2	ITM & Group Select	75	Helicopter	No new road
3	Clearcut w/reserves	15	Helicopter	No new road
5 6	Clearcut w/reserves	15	Helicopter	

Doughnut Timber Sale

Volstrata Acres

Low 1Medium 5High 0**Unit Number 16****Unit Acres 6**Net Volume (MBF/Acre) 23 MBF**Unit Development & Stand Description**

Species composition is 40% hemlock, 35% spruce and 25% yellow cedar. There has been no management in the stand. Stand is uneven-aged with western hemlock spruce and yellow cedar present. Alder patches boarder unit to the east, west and north. The southern edge of the unit is adjacent to a class III stream protection buffer. Unit is located at 800 to 1000 feet above sea level on 20%-60% slopes. Stand aspect is south.

Alternatives 2, 3, 5, and 6 retain 40 % of the trees throughout the unit. Logs would be helicopter yarded to a landing on Department of Natural Resources land.

	<u>Alts. 2, 3, 5, & 6</u>
Treatment	Individual tree group selection
Percentage of Retention	40%
Leave trees for Marten	No
Harvest Acres	6
Harvest Volume (MBF)	83
Cable Logging System Acres	0
Helicopter Logging System Acres	6
Yarded To	DNR land

Stand Management Objectives:

Alternatives 2, 3, 5 and 6: Future stand will be predominantly uneven-age with multiple canopy layers. Approximately 40% of the trees per acre would be left to meet visual objectives. Natural regeneration is expected.

Water Quality Fisheries

Concern: Unit adjacent to Mom's Creek tributary (Class III/HC6). Unit may contain Class IV tributaries to Mom's Creek.

Mitigation: Unit boundary provides side-slope buffer on Class III stream. Provide full suspension wherever possible across Class IV streams; at least partial suspension is required. (BMPs 12.6, 12.6a, 13.9, 13.16)

Soils

Concern: No concern

Wildlife

Concern: No concern

Visuals

Concern: This unit is not visible from any Visual Priority Routes or Use Areas. No visual concerns.

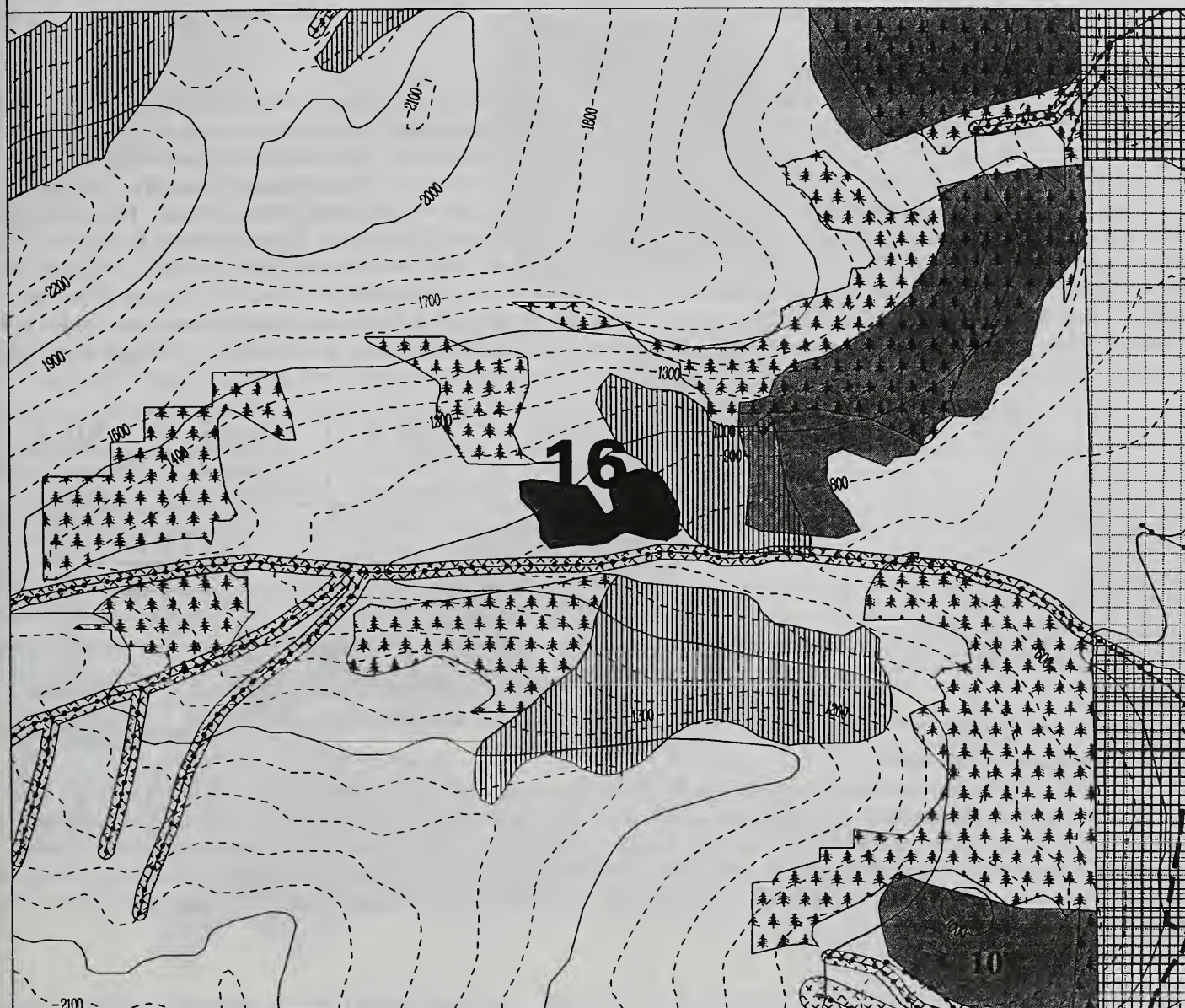
Mitigation:

Mitigation Measures: F1, F2, F3, F11, F15, F18, T1, T2, W33, H1, H2, and H3

6 ACRES

ALTERNATIVE 2 3 5 6

UNIT 16



Class I Stream



Class II Stream



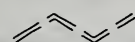
Class III Stream



Class IV Stream



Existing Road



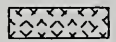
Proposed USFS Road



Planned State Road



Eagle Nest Tree



Riparian Buffer



TTRA Buffer



High Hazard Soil



Planned State Units

Scale: 1 inch = 1000 feet

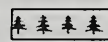
Last Updated: March 08, 2000



Proposed cut unit



Adjacent proposed units



Marten Guidelines Apply



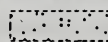
State or Private Land



Existing Harvest Unit



Saltwater and Lakes



1/4 Mile Eagle Nest Buffer

Alternative	Prescription	Retention	Harvest System	Comments
2 3 5 6	ITM & Group Select	40	Helicopter	

Doughnut Timber SaleVolstrata Acres Low 4Medium 11**Unit Number 17**High 29**Unit Acres 44**Net Volume (MBF/Acre) 28 MBF**Unit Development & Stand Description**

Species composition is 65% hemlock, 25% spruce and 10% yellow cedar. There has been no management in the stand. Decedent hemlock is common throughout most of the stand. Small diameter western hemlock trees are abundant in areas dominated by larger decedent hemlock. Spruce occur scattered and in patches throughout the unit. The western most portion of the unit, approximately 5-7 acres, is dominated by large even-aged spruce. Yellow cedar is scattered through a majority of the unit. Unit is located at 800 to 1200 feet above sea level on 40 to 72% slopes. Stand aspect is primarily south-southeast. Portions of this stand are exposed to prevailing southeasterly winds and show a history of wind disturbance. Dwarf mistletoe is present but not severe. **Alternative 2** retains 75% of the existing trees throughout the unit. Logs would be helicopter yarded to a landing on Department of Natural Resources land. **Alternatives 3, 4, & 5** retain 10% of the existing trees and Alt 6 retains 75% of the existing trees. Reserve trees would be scattered throughout the unit in **Alts 3, 5 & 6** and logs would be helicopter yarded to a landing on Department of Natural Resources land. **Alternatives 4** Retain 40% for visual and wildlife, in clump or along split lines and cable yard 40 acres. Oversteepened slopes are avoided. Log would be yarded to the proposed spur road in unit.

	<u>Alt. 2</u>	<u>Alt. 3</u>	<u>Alt. 4</u>	<u>Alt. 5</u>	<u>Alt. 6</u>
	Individual tree & group selection	Clearcut w/reserves	Clearcut w/reserves	Clearcut w/reserves	Diameter Limits w/exclusions
Percentage of Retention	75%	10%	10%	10%	75%
Leave trees for Marten	Yes	Yes	Yes	Yes	Yes
Harvest Acres	32	44	40	44	32
Harvest Volume (MBF)	431	1,109	1,008	1,109	486
Cable Logging System Acres	0	0	40	0	0
Helicopter Logging System Acres	44	44	0	44	44
Yarded To	DNR Landing 2	DNR Landing 2	Proposed Road	Proposed DNR Road	Proposed DNR Road

Stand Management Objectives:

Alternative 2 & 6: Future stand will be uneven-age with multiple canopy layers. Approximately 75% of the trees per acre would be left to meet visual objectives. Retention would allow for multiple entries throughout the rotation. **Alternatives 3, 4, and 5:** Future stand will be predominantly even-age. Smaller diameter trees will be retained for visual objectives. A small number of large diameter trees will be retained to meet wildlife objectives. Trees retained in this entry will remain throughout the rotation. For **Alts 3, 4, & 5**, Natural regeneration is expected. Pre-commercial thinning at age 20-30 years to 110-180 trees per acre.

Water Quality Fisheries

Concern: Unit adjacent to Mom's Creek tributary (Class III/HC6). Unit may contain Class IV tributaries to Mom's Creek.

Mitigation: Unit boundary provides side-slope buffer on Class III stream. Provide full suspension wherever possible across Class IV streams; at least partial suspension is required. (BMPs 12.6, 12.6a, 13.9, 13.16)

Soils

Concern: Steep slopes on northeast side of unit.

Mitigation: Locate unit to avoid slopes >85% or design windfirm exclusion. Alt 4 spur road to be constructed to facilitate natural regeneration on the running surface, either by using wood mulch over crushed rock, or adding mineral soil to wood mulch.

Wildlife

Concern: High value marten habitat; wildlife corridor values

Mitigation: Retain 7 trees >20 inches DBH (4 live trees and 3 decadent) and 3 pieces of downed material with >20"dbh per acre to meet marten standards. Unharvested forested habitat adjacent to the unit and along Mom's Creek tributary will maintain corridor values.

Visuals

Concern: This unit is visible from the Eastern Passage Viewpoint, and partially visible from the Mill Creek Viewpoint. Meet the Partial Retention VQO.

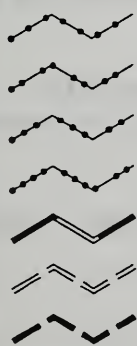
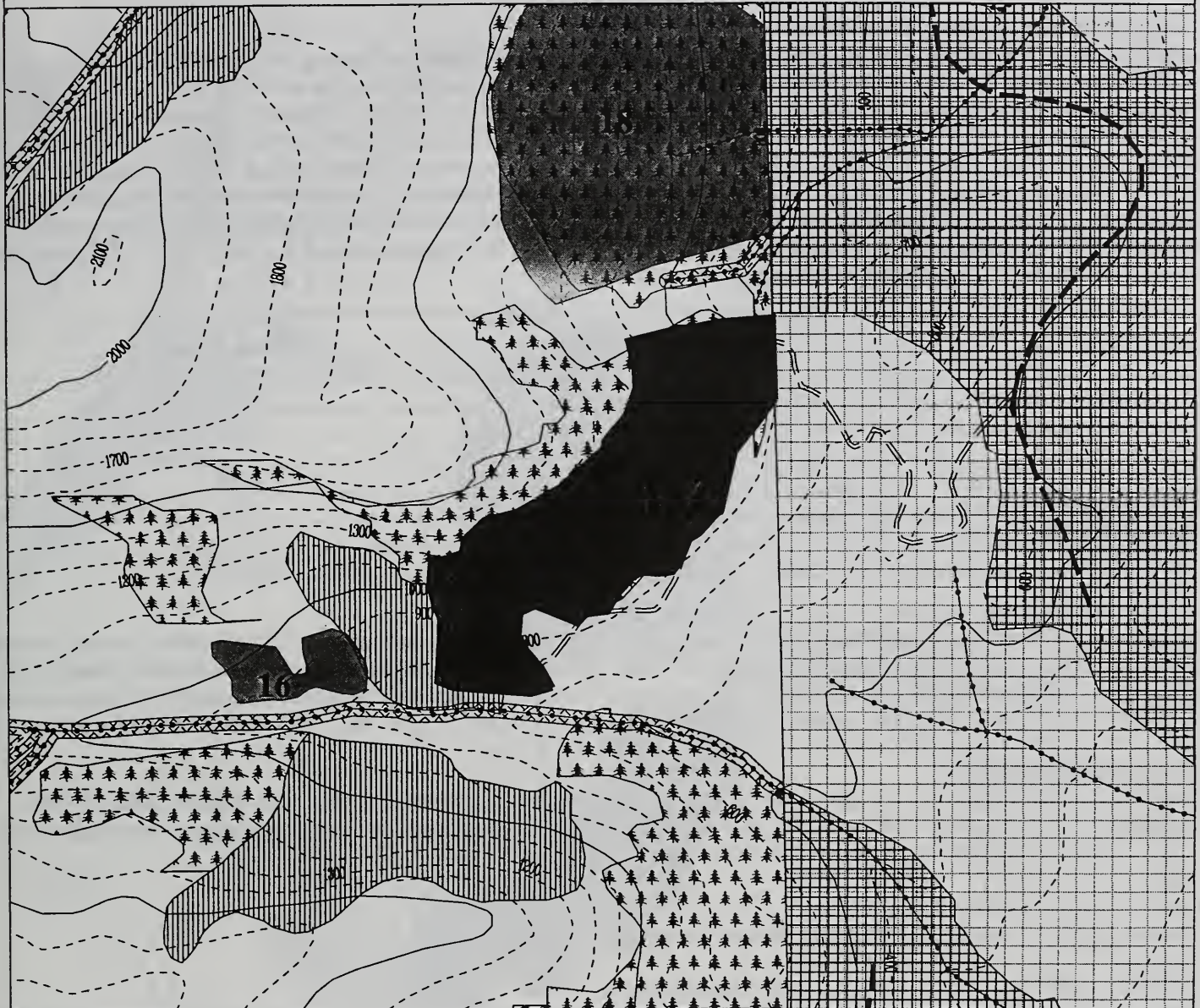
Mitigation: In Alternatives 2 and 6, the proposed 75% retention will alleviate visual concerns. In Alternatives 3, 4, and 5, this unit will appear as a large opening (40 acres). Distribute the retention as evenly as possible to provide uniform texture across the unit.

Mitigation Measures: F1, F2, F3, F9, F10, F11, F12, F13, F14, F15, F16, F17, F18, F19, T1, T2, W1, W4, W6, W7, W8, W21, W22, W28, W33, H1, H2, H3, V1, V4, V6, V7, V8, V9, V10, and S1

44 ACRES

ALTERNATIVE 2 3 4 5 6

UNIT 17



Class I Stream

Class II Stream

Class III Stream

Class IV Stream

Existing Road

Proposed USFS Road

Planned State Road



Eagle Nest Tree



Riparian Buffer



TTRA Buffer



High Hazard Soil



Planned State Units

Scale: 1 inch = 1000 feet

Last Updated: March 27, 2000



Proposed cut unit



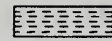
Adjacent proposed units



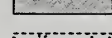
Marten Guidelines Apply



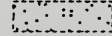
State or Private Land



Existing Harvest Unit



Saltwater and Lakes



1/4 Mile Eagle Nest Buffer

Alternative	Prescription	Retention	Harvest System	Comments
2	ITM & Group Select	75	Helicopter	No spur road to unit
3 5	Clearcut w/reserves	10	Helicopter	No spur road to unit
4	Clearcut w/reserves	10	Helicopter	Builds spur road to unit
6	Diameter Limits	75	Helicopter	No spur road to unit

Doughnut Timber SaleVolstrata Acres Low 1Medium 3**Unit Number 18**High 57**Unit Acres 61**Net Volume (MBF/Acre) 25 MBF**Unit Development & Stand Description**

Species composition is 65% hemlock, 20% spruce and 15% yellow cedar. There has been no management in the stand. Decedent hemlock is common throughout most of the stand. Small diameter western hemlock trees are abundant in most of the stand's understory. Spruce occur scattered and in patches throughout the unit. Yellow cedar mainly occurs scattered and in patches above the 1000 foot elevation and in the southern portion of the unit. Unit is located at 800 to 1500 feet above sea level on 30% to 70% slopes. Stand aspect is primarily east. Portions of this stand are exposed to prevailing southeasterly winds and show a history of wind disturbance. Dwarf mistletoe is present but not severe. **Alternative 2** retains 75% of the existing trees throughout the unit. Logs would be helicopter yarded to a landing on Department of Natural Resources land. **Alternatives 3 and 5** retain 30% of the existing trees. Reserve trees would be scattered and in clumps throughout the unit. Logs would be helicopter yarded to a landing on Department of Natural Resources land.

	<u>Alt. 2</u>	<u>Alt. 3 & 5</u>
	Individual tree & group selection	Diameter Limits w/exclusions
Percentage of Retention	75%	30%
Leave trees for Marten	Yes	Yes
Harvest Acres	15	43
Harvest Volume (MBF)	534	1220
Cable Logging System Acres	0	0
Helicopter Logging System Acres	61	61
Yarded To	DNR land	DNR land

Stand Management Objectives:

Alternative 2: Future stand will be uneven-age with multiple canopy layers. Approximately 75% of the trees per acre would be left to meet visual objectives. Retention would allow for multiple entries throughout the rotation. **Alternatives 3 and 5:** Future stand would be predominantly two-aged due to the retention of reserve trees and trees retained by diameter limits representing more than one age class. Volume retained would be available for harvest in a future entry. Natural regeneration is expected.

Water Quality Fisheries

Concern: Unit is adjacent to Bump Creek tributary (Class III/HC6). Unit contains Class IV tributaries to Bump Creek.

Mitigation: Unit boundary provides side-slope buffer on Class III stream. Provide full suspension wherever possible across Class IV streams; at least partial suspension is required. (BMPs 12.6, 12.6a, 13.9, 13.16)

Soils

Concern: Slopes steeper than 72%

Mitigation: 30% retention is expected to maintain rooting strength

Wildlife

Concern: High value marten habitat; wildlife corridor values

Mitigation: Retain 7 trees >20 inches DBH (4 live trees and 3 decadent) and 3 pieces of downed material with >20" dbh per acre to meet marten standards and maintain some corridor values.

Visuals

Concern: This unit is visible from the Eastern Passage and Mill Creek Viewpoints. Meet the Partial Retention VQO.

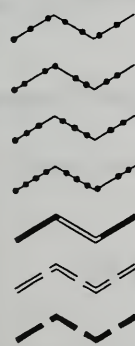
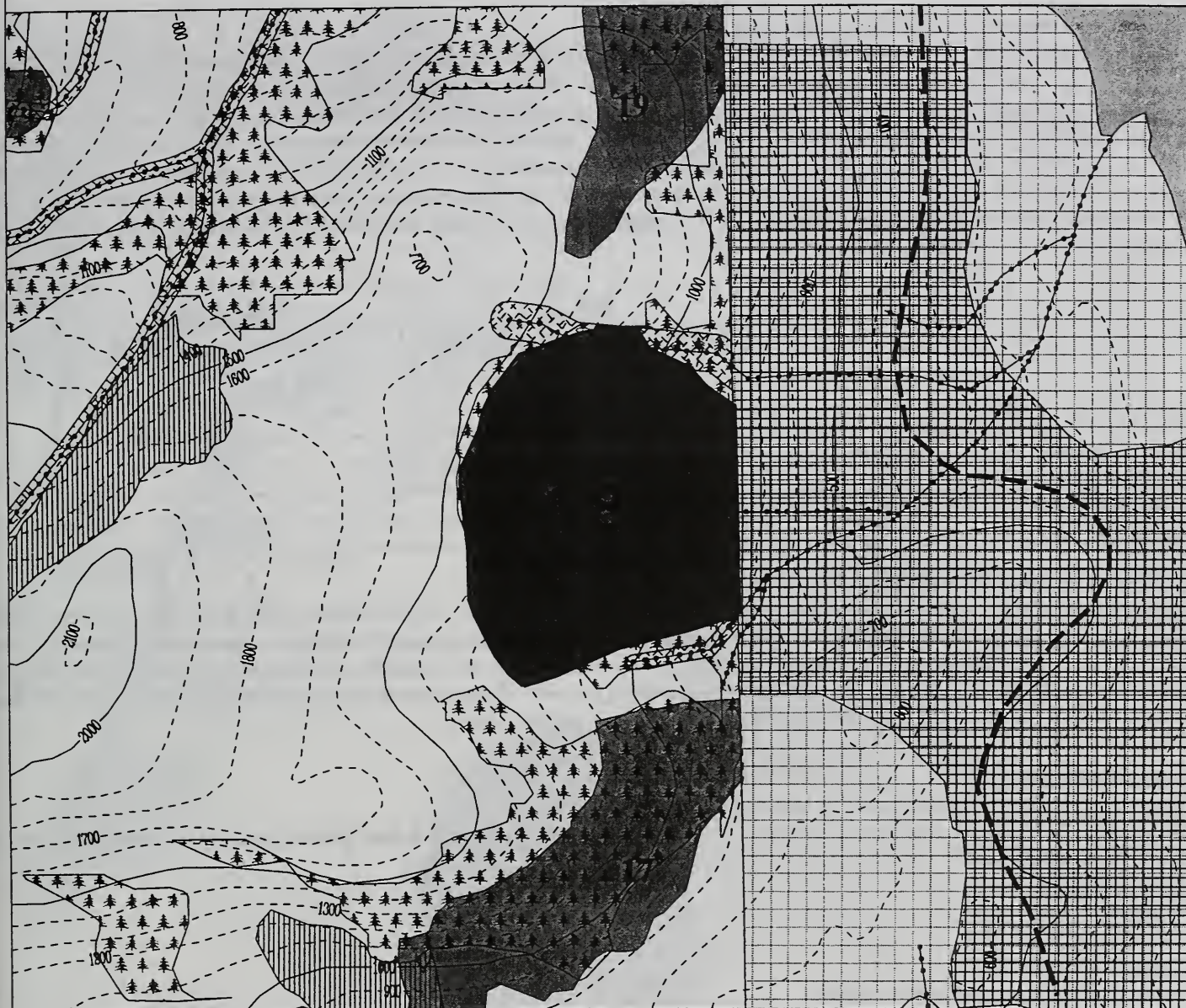
Mitigation: The proposed 75% retention in Alternative 2 will alleviate visual concerns. In Alternatives 3 and 5, the proposed 30% retention should be evenly distributed to avoid the appearance of a large opening.

Mitigation Measures: F1, F2, F3, F11, F15, F18, T1, T2, W4, W6, W7, W8, W21, W22, W28, W33, H1, H2, H3, V4, V6, V7, and V8

61 ACRES

ALTERNATIVE 2 3 5

UNIT 18



Class I Stream

Class II Stream

Class III Stream

Class IV Stream

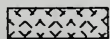
Existing Road

Proposed USFS Road

Planned State Road



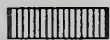
Eagle Nest Tree



Riparian Buffer



TTRA Buffer



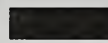
High Hazard Soil



Planned State Units

Scale: 1 inch = 1000 feet

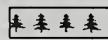
Last Updated: March 27, 2000



Proposed cut unit



Adjacent proposed units



Marten Guidelines Apply



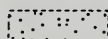
State or Private Land



Existing Harvest Unit



Saltwater and Lakes



1/4 Mile Eagle Nest Buffer

Alternative	Prescription	Retention	Harvest System	Comments
2	ITM & Group Select	75	Helicopter	
3 5	Diameter Limits	30	Helicopter	

Doughnut Timber SaleVolstrata Acres Low 1Medium 15**Unit Number 19**High 10**Unit Acres 25**Net Volume (MBF/Acre) 19 MBF**Unit Development & Stand Description**

Species composition is 65% hemlock, 10% spruce and 25% yellow cedar. There has been no management in the stand. There are less than 10 spruce trees per acre throughout most of the unit. Yellow cedar mainly occurs scattered and in patches above the 1000 foot elevation and in the southern finger of the unit. Unit is located at 800 to 1500 feet above sea level on 40% to 70% slopes. Stand aspect is primarily east. Portions of this stand are exposed to prevailing southeasterly winds and show a history of wind disturbance. Dwarf mistletoe is present but not severe. **Alternative 2** retains 75% of the existing trees throughout the unit. Logs would be helicopter yarded to a landing on Department of Natural Resources land. **Alternatives 3 and 5** retain 25% of the existing trees. Reserve trees will be scattered and in clumps throughout the unit. Logs would be helicopter yarded to a landing on Department of Natural Resources land.

	<u>Alt. 2</u>	<u>Alt. 3 & 5</u>
Treatment	Individual tree & group selection	Clearcut with Reserves
Percentage of Retention	75%	25%
Leave trees for Marten	Yes	Yes
Harvest Acres	9	26
Harvest Volume (MBF)	165	404
Cable Logging System Acres	0	0
Helicopter Logging System Acres	25	25
Yarded To	DNR land	DNR land

Stand Management Objectives:

Alternative 2: Future stand will be uneven-age with multiple canopy layers. Approximately 75% of the trees per acre would be left to meet visual objectives. Retention would allow for multiple entries throughout the rotation. **Alternatives 3 and 5:** Future stand will be predominantly two-aged due to the retention of reserve trees and diameter limits retaining smaller trees. All species represented in the stand prior to harvest will be present within the unit. Trees retained within the unit may be available for harvest at the time of future stand treatments. Natural regeneration is expected.

Water Quality Fisheries

Concern: Unit may contain Class IV streams.

Mitigation: Provide full suspension wherever possible across Class IV streams; at least partial suspension is required. (BMPs 13.9, 13.16)

Soils

Concern: No concern

Wildlife

Concern: High value marten habitat

Mitigation: Retain 7 trees >20 inches DBH (4 live trees and 3 decadent) and 3 pieces of downed material with >20" dbh per acre to meet marten standards.

Visuals

Concern: Unit 19 is partially visible from the Eastern Passage Viewpoint, and fully visible from the Mill Creek Viewpoint. Meet the Partial Retention VQO.

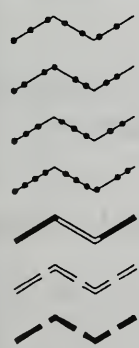
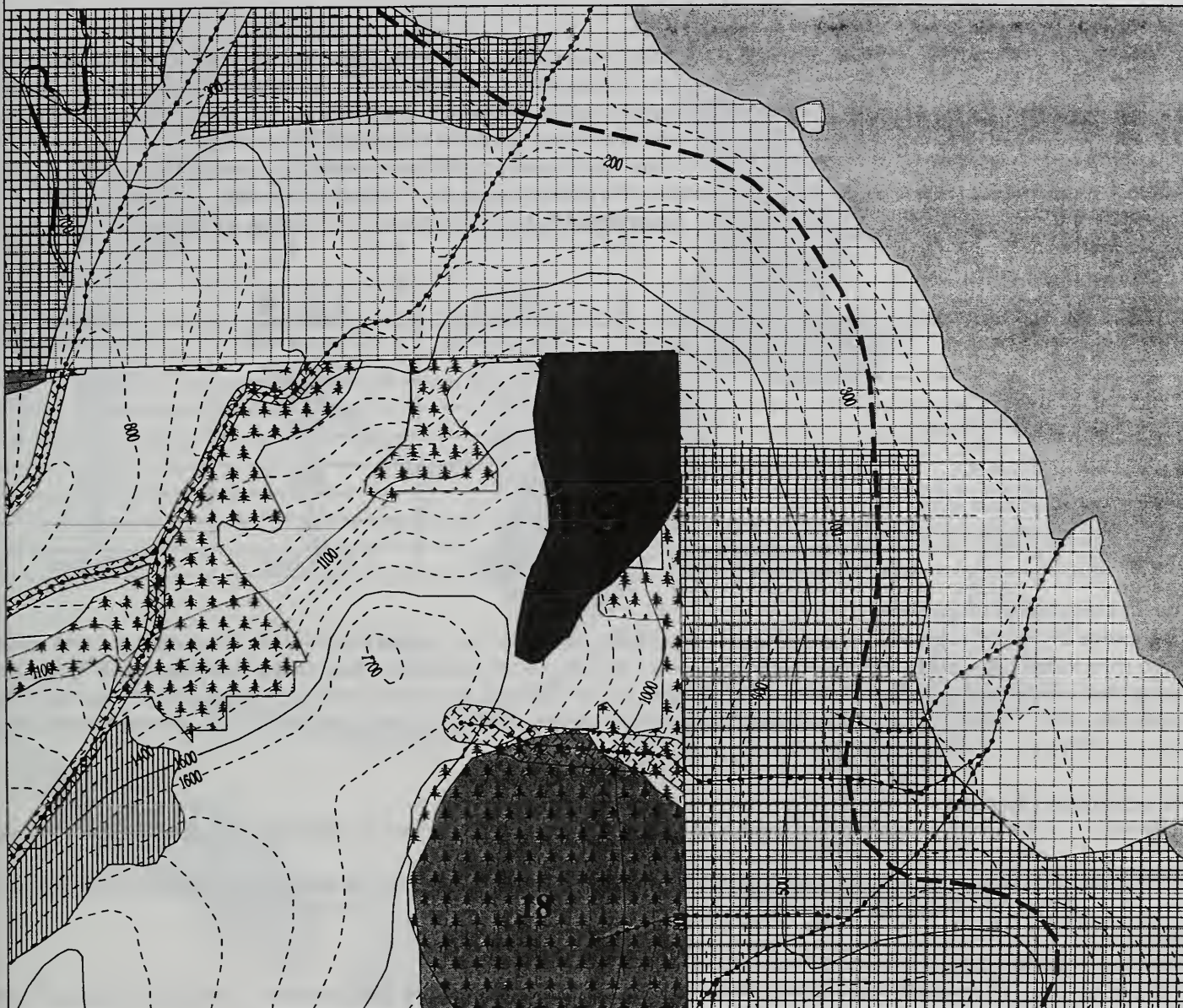
Mitigation: The 75% proposed retention in Alternative 2 would alleviate visual concerns. The proposed 25% retention in Alternatives 3 and 5 should be evenly distributed to avoid the appearance of a large opening.

Mitigation Measures: F3, F11, F18, T1, T2, W1, W4, W6, W7, W28, W33, H1, H2, H3, V1, V4, V6, V7, and V8

25 ACRES

ALTERNATIVE 2 3 5

UNIT 19



Class I Stream

Class II Stream

Class III Stream

Class IV Stream

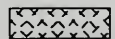
Existing Road

Proposed USFS Road

Planned State Road



Eagle Nest Tree



Riparian Buffer



TTRA Buffer



High Hazard Soil



Planned State Units



Proposed cut unit



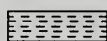
Adjacent proposed units



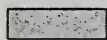
Martens Guidelines Apply



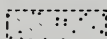
State or Private Land



Existing Harvest Unit



Saltwater and Lakes



1/4 Mile Eagle Nest Buffer

Scale: 1 inch = 1000 feet

Last Updated: March 27, 2000

Alternative	Prescription	Retention	Harvest System	Comments
2	ITM & Group Select	75	Helicopter	
3 5	Clearcut w/reserves	25	Helicopter	

Doughnut Timber Sale**Unit Number 23****Unit Acres 27**

Volstrata Acres

Low 6Medium 17High 4Net Volume (MBF/Acre) 20 MBF**Unit Development & Stand Description**

Species composition is 55% hemlock, 15% spruce and 30% yellow cedar. There has been no management in the stand. Decedent western hemlock is common throughout the unit. Spruce can be found scattered primarily in the lower half of the unit. Yellow cedar is common throughout the unit and dominant in upper portions of the unit. Unit is located at 1100 to 1600 feet above sea level on 40 to 72% slopes. Stand aspect is primarily southeast. Dwarf mistletoe is present but not severe.

Alternative 2 retains 75% of the trees throughout the unit. Logs would be helicopter yarded to a landing on Department of Natural Resources land. **Alternatives 3, 5, and 6:** retain 10% of the existing trees throughout the unit. For **Alts 3, 5, and 6** reserve trees would be scattered throughout the unit. Logs would be helicopter yarded to a landing on Department of Natural Resources land.

	<u>Alt. 2</u>	<u>Alt. 3</u>	<u>Alts. 5</u>	<u>Alts. 6</u>
Treatment	Individual tree & group selection	Clearcut with Reserves	Clearcut with Reserves	Clearcut with Reserves
Percentage of Retention	75%	10%	10%	10%
Leave trees for Marten	Yes	Yes	Yes	Yes
Harvest Acres	7	27	27	27
Harvest Volume (MBF)	189	486	486	486
Cable Logging System Acres	0	0	0	0
Helicopter Logging System Acres	27	27	27	27
Yarded To	DNR land	DNR land	DNR land	DNR land

Stand Management Objectives:

Alternative 2: Future stand will be uneven-age with multiple canopy layers. Approximately 75% of the trees per acre would be left to meet visual objectives. Retention would allow for multiple entries throughout the rotation. **Alternatives 3, 5, and 6:** Future stand would be predominantly even-aged. Retain 10% in **Alts 3, 5, & 6** of the existing trees per acre to meet wildlife and visual objectives. Trees retained will remain throughout the rotation. Natural regeneration is expected. Precommercial thinning at age 20-30 years to 110-180 trees per acre.

Water Quality Fisheries

Concern: Unit adjacent to Rack Creek tributaries (Class III/HC5 and HC6). Unit may contain Class IV tributaries to Rack Creek.

Mitigation: Unit boundary provides side-slope buffer on Class III streams. Provide full suspension wherever possible across Class IV streams; at least partial suspension is required. (BMPs 12.6, 12.6a, 13.9, 13.16)

Soils

Concern: Steep slopes in unit and on west side of unit.

Mitigation: Locate boundary to avoid steep slopes west of unit; helicopter harvest with retention to minimize disturbance and maintain rooting strength.

Wildlife

Concern: High value marten habitat. Eagle nest on State land.

Mitigation: Retain 7 trees >20 inches DBH (4 live trees and 3 decadent) and 3 pieces of downed material with >20" dbh per acre to meet marten standards. Avoid continuous helicopter disturbance within 1/4 mile of any active eagle nests.

Visuals

Concern: This unit is visible from the Mill Creek Viewpoint. Meet the Partial Retention VQO.

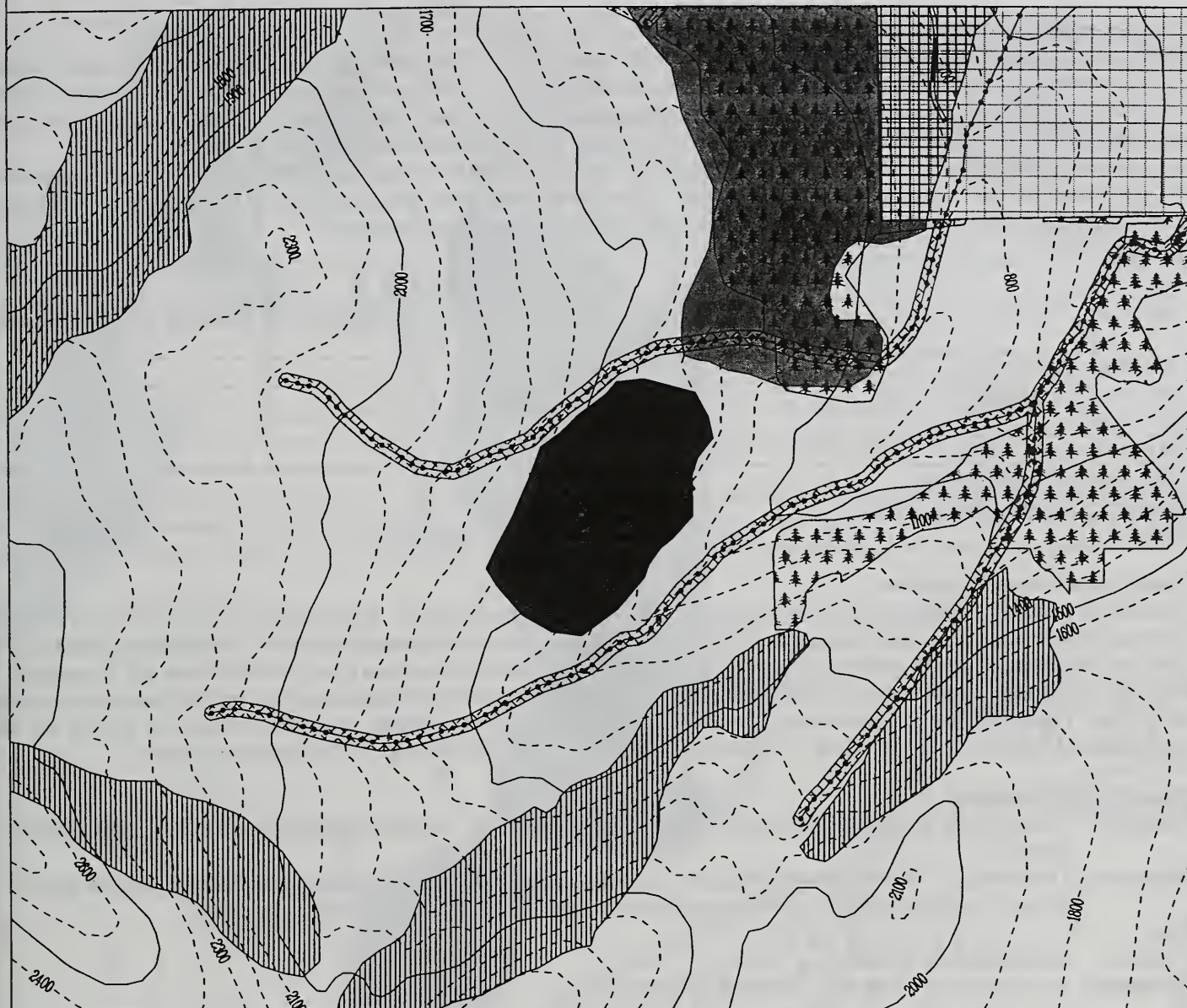
Mitigation: The proposed 75% retention in Alternative 2 will alleviate visual concerns. In Alternatives 3, 5, and 6, distribute the proposed 10% retention evenly across the unit to provide visual texture.

Mitigation Measures: F3, F11, F18, F19, T1, T2, W1, W4, W6, W7, W8, W13, W21, W22, W28, W33, H1, H2, H3, V1, V4, V6, V7, and V8

27 ACRES

ALTERNATIVE 2 3 5 6

UNIT 23



Class I Stream



Class II Stream



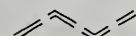
Class III Stream



Class IV Stream



Existing Road



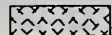
Proposed USFS Road



Planned State Road



Eagle Nest Tree



Riparian Buffer



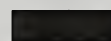
TTRA Buffer



High Hazard Soil



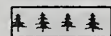
Planned State Units



Proposed cut unit



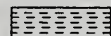
Adjacent proposed units



Marten Guidelines Apply



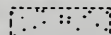
State or Private Land



Existing Harvest Unit



Saltwater and Lakes



1/4 Mile Eagle Nest Buffer

Scale: 1 inch = 1000 feet

Last Updated: March 27, 2000

Alternative	Prescription	Retention	Harvest System	Comments
2	ITM & Group Select	75	Helicopter	
3 4 6	Clearcut w/reserves	10	Helicopter	

Doughnut Timber SaleVolstrata Acres Low 2**Unit Number 24**Medium 14 High 77**Unit Acres 93**Net Volume (MBF/Acre) 25 MBF**Unit Development & Stand Description**

Species composition is 65% hemlock, 15% spruce and 20% yellow cedar. There has been no management in the stand. Decedent western hemlock is common throughout the unit. Spruce can be found scattered primarily in the lower half of the unit. Yellow cedar is common throughout the unit and dominant in upper portions of the unit. Unit is located at 500 to 1380 feet above sea level on 40% to 72% slopes. Stand aspect is primarily southeast. Dwarf mistletoe is present but not severe.

Alternatives 2 and 6 retain 75% of the trees throughout the unit. Logs will be helicopter yarded to a landing on Department of Natural Resources land. **Alternatives 3, and 5:** retain 50% of the existing trees. Reserve trees will be scattered throughout the unit. Logs will be helicopter yarded to a landing on Department of Natural Resources land.

	<u>Alt. 2</u>	<u>Alt. 3 & 5</u>	<u>Alt. 6</u>
Treatment	Individual tree	Diameter Limits w/exclusions & LTM	Diameter Limits w/exclusions & LTM
Percentage of Retention	75	50	75
Leave trees for Marten	Yes	Yes	Yes
Harvest Acres	93	88	83
Harvest Volume (MBF)	814	1,404	814
Cable Logging System Acres	0	0	0
Helicopter Logging System Acres	93	93	93
Yarded To	DNR land	DNR land	DNR land

Stand Management Objectives:

Alternative 2 and 6: Future stand will be uneven-age with multiple canopy layers. Approximately 75% of the trees per acre will be left to meet visual objectives. Retention will allow for multiple entries throughout the rotation. **Alternatives 3 and 5:** Future stand will be two-aged due to retention of reserve trees representing more than one age class. Smaller trees will be retained according to diameter limits and exclusions within the unit. Large trees will be left throughout the unit by leave tree marking and exclusions. Trees are retained in order to meet wildlife and visual objectives. Volume retained will allow for harvest in a future entry. Natural regeneration is expected. Pre-commercial thinning at age 20-30 years to 110-180 trees per acre.

Water Quality Fisheries

Concern: Unit contains Rack Creek tributaries (Class III/HC5 and HC6). Unit may contain Class IV tributaries to Rack Creek.

Mitigation: Unit design provides side-slope buffer on Class III streams. Provide full suspension wherever possible across Class IV streams; at least partial suspension is required. (BMPs 12.6, 12.6a, 13.9, 13.16)

Soils

Concern: Steep slopes in the unit.

Mitigation: Exclusions will be located on oversteepened slopes.

Wildlife

Concern: High value marten habitat; adjacent State harvest and wildlife corridor values; raptor sightings; murrelet activity; eagle nest on State land.

Mitigation: Retain 7 trees >20 inches DBH (4 live trees and 3 decedent) and 3 pieces of downed material with >20"dbh per acre to meet marten standards. Higher retention will maintain structure and cover for wildlife. Apply no-harvest nest buffer if a raptor nest is located. If eggshell fragments are discovered, flag closest tree and report to biologist. Avoid continuous helicopter disturbance within 1/4 mile of any active eagle nests.

Visuals

Concern: This unit is visible from the Mill Creek Viewpoint. Meet the Partial Retention VQO.

Mitigation: The proposed 75% retention in Alternatives 2 and 6 will alleviate visual concerns. In Alternatives 3 and 5, the proposed 50% retention will help to alleviate visual concerns; distribute the retention evenly to avoid the appearance of a large opening.

Mitigation Measures: F1, F2, F3, F4, F11, F15, F18, F19, T1, T2, W4, W6, W7, W8, W13, W16, W17, W21, W22, W28, W33, H1, H2, H3, V4, V6, V7, and V8

Doughnut Timber Sale**Unit Number 24B****Unit Acres 10**Volstrata Acres Low 0 Medium 0 High 10Net Volume (MBF/Acre) 10 MBF**Unit Development & Stand Description**

Species composition is 60% hemlock, 10% spruce and 25% yellow cedar. Western hemlock is evenly aged in northeast portions of the stand. Decedent western hemlock is common throughout the unit. Yellow cedar is common in southern and upper portions of the unit. Unit is located at 850 to 1100 feet above sea level on 20 to 65% slopes. Stand aspect is primarily east. Dwarf mistletoe is present but not severe. **Alternative 4** retains 10% of the existing trees per acre. This unit is that portion of unit 24 that can be harvested by cable from the existing DNR road.

	<u>Alt. 4</u>
Treatment	Clearcut w/reserves
Percentage of Retention	10%
Leave trees for Marten	Yes
Harvest Acres	10
Harvest Volume (MBF)	225
Cable Logging System Acres	10
Helicopter Logging System Acres	0
Yarded To	DNR Landing

Stand Management Objectives:

Alternative 4: Future stand would be even-aged. Retention will remain throughout the rotation. Retention will meet wildlife and visual objectives. Natural regeneration is expected. Pre-commercial thinning at age 20-30 years to 110-180 trees per acre.

Water Quality Fisheries

Concern: Unit may contain Class IV tributaries to Rack Creek.

Mitigation:

Soils

Concern: No concern

Wildlife

Concern: High value marten habitat

Mitigation: Retain 7 trees >20 inches DBH (4 live trees and 3 decadent) and 3 pieces of downed material with >20" dbh per acre to meet marten standards.

Visuals

Concern: Unit 24B is visible from the Mill Creek Viewpoint. Meet the Partial Retention VQO.

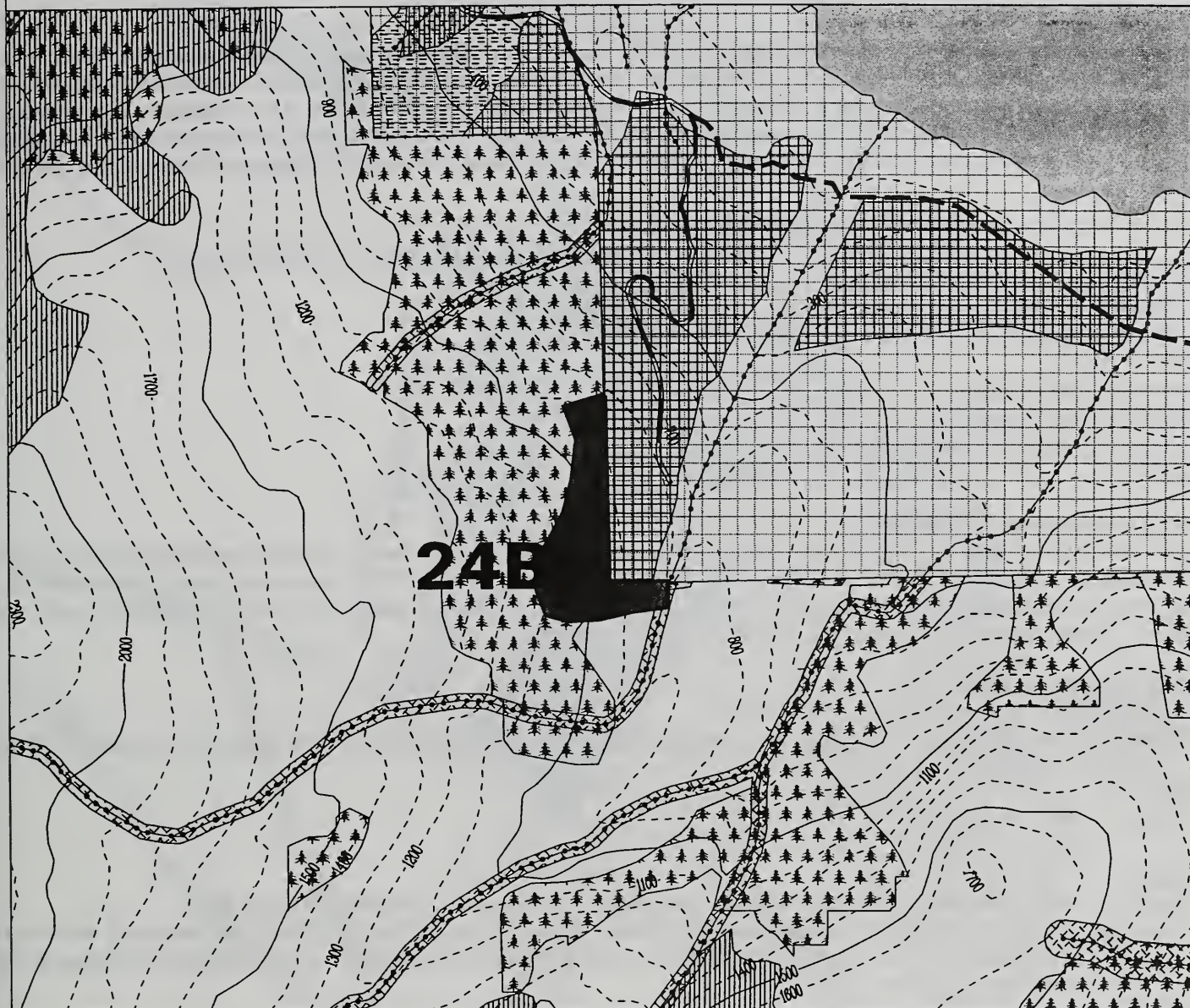
Mitigation: The small size of this unit will help to alleviate visual concerns. Distribute the proposed 10% retention evenly to provide texture.

Mitigation Measures: F3, F11, F18, F19, T1, T2, W1, W7, W8, W13, W16, W17, W21, W22, W28, W33, H1, H2, H3, V1, V7, and V8

10 ACRES

ALTERNATIVE 4

UNIT 24B



Class I Stream



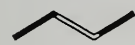
Class II Stream



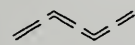
Class III Stream



Class IV Stream



Existing Road



Proposed USFS Road



Planned State Road



Eagle Nest Tree



Riparian Buffer



TTRA Buffer



High Hazard Soil



Planned State Units



Proposed cut unit



Adjacent proposed units



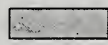
Marten Guidelines Apply



State or Private Land



Existing Harvest Unit



Saltwater and Lakes



1/4 Mile Eagle Nest Buffer

Scale: 1 inch = 1000 feet

Last Updated: March 27, 2000

Alternative	Prescription	Retention	Harvest System	Comments
4	Clearcut w/reserves	10	Cable	Builds spur to unit

Doughnut Timber SaleVolstrata Acres Low 0Medium 16**Unit Number PC1**High 6**Unit Acres 22**Net Volume (MBF/Acre) 20 MBF**Unit Development & Stand Description**

Species composition is 65% hemlock, 15% spruce, and 10% yellow cedar. There has been no management in the stand. Decadent western hemlock is common throughout the unit. Spruce is scattered throughout the unit. Yellow cedar is scattered throughout the unit. Unit is located at 1100 to 1500 feet above sea level on 40 to 70% slopes. Dwarf mistletoe is present but not severe. **Alternatives 2**, retains 75%, **Alternatives 3, 5, and 6**: retain 70% of the existing trees. Harvest areas (patches) would consist of 3-5 openings not exceeding 3 acres in size. Logs would be helicopter yarded to a landing on Department of Natural Resources land.

	<u>Alt. 2</u>	<u>Alts. 3, 5 & 6</u>
Treatment	Patch cut	Patch cut
Percentage of Retention	75%	70%
Leave trees for Marten	Yes	Yes
Harvest Acres	6	6
Harvest Volume (MBF)	110	132
Cable Logging System Acres	0	0
Helicopter Logging System Acres	22	22
Yarded To	DNR land	DNR land

Stand Management Objectives:

Alternatives 2, 3, 5 and 6: Future stand would be predominantly uneven-aged. Harvest this entry would retain a multi-layered stand with 1-3 acre even-aged patches. **Alternative 2** will not remove more than 25% of the existing stand. **Alternatives 3, 5, and 6** may exceed 25% but will leave at least 70%. Remaining volume outside of patch cuts would allow for 1 to 2 other future entries. Natural regeneration is expected in openings.

Water Quality Fisheries

Concern: Unit may contain Class IV tributaries.

Mitigation: Provide full suspension wherever possible across Class IV streams; at least partial suspension is required. (BMPs 13.9, 13.16)

Soils

Concern: No concern

Wildlife

Concern: High value marten habitat; wildlife corridor; numerous game trails; possibility of raptor nests.

Mitigation: Partial harvest will retain wildlife corridor values. Retain 7 trees >20 inches DBH (4 live trees and 3 decadent) and 3 pieces of downed material with >20" dbh per acre to meet marten standards. Avoid continuous disturbance around any active raptor nests.

Visuals

Concern: Unit PC1 is partially visible from the Eastern Passage and Mill Creek Viewpoints. Meet the Partial Retention VQO.

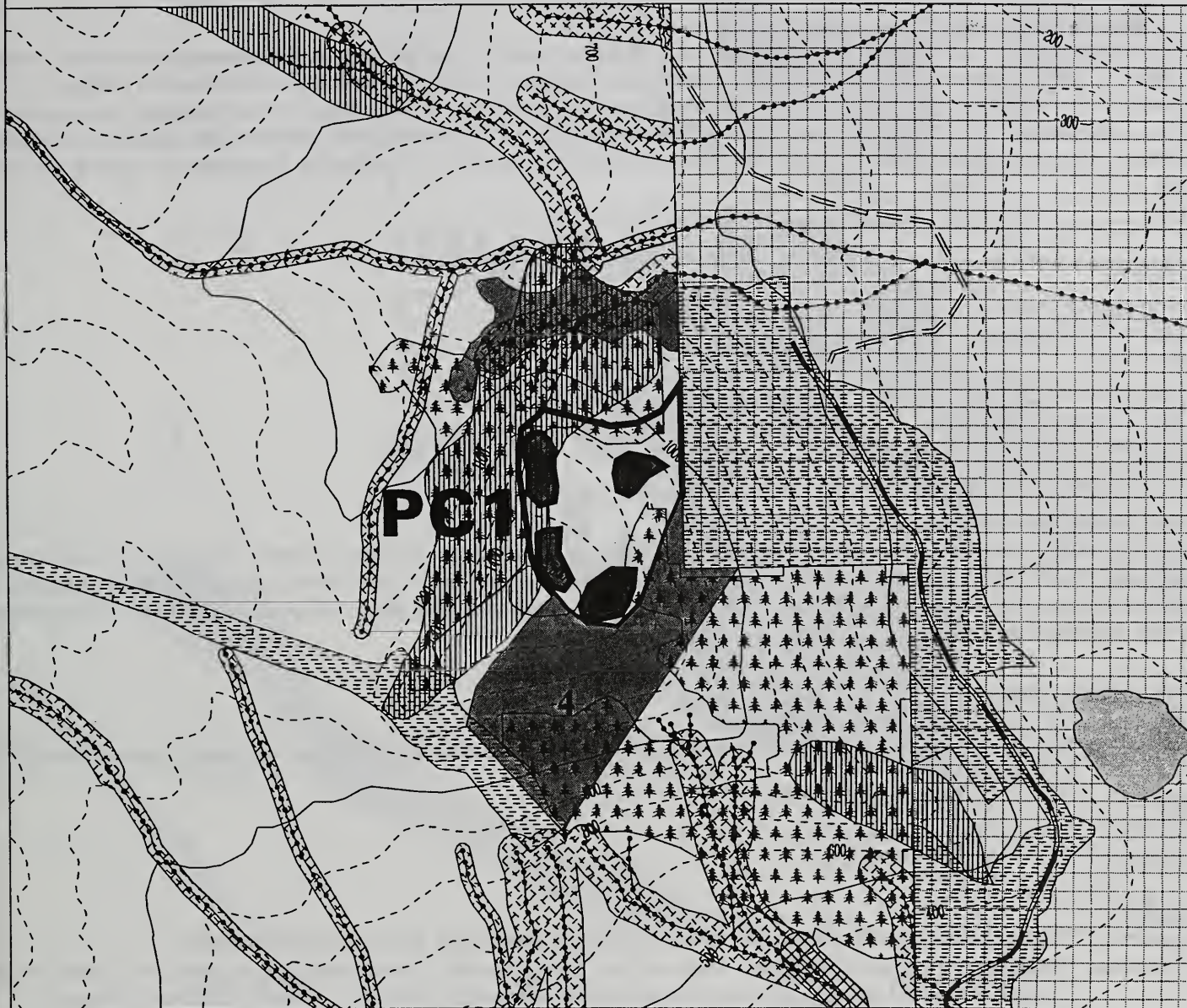
Mitigation: The small sizes of the proposed patches, along with the 70-75% retention proposed will alleviate visual concerns.

Mitigation Measures: F1, F2, F3, F4, F11, F15, F18, F19, T1, T2, W5, W7, W8, W13, W21, W22, W28, W33, H1, H2, H3, V5, V7, and V8

17 ACRES

ALTERNATIVE 3 5 6

UNIT PC1



Class I Stream



Class II Stream



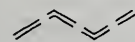
Class III Stream



Class IV Stream



Existing Road



Proposed USFS Road



Planned State Road



Eagle Nest Tree



Riparian Buffer



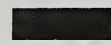
TTRA Buffer



High Hazard Soil



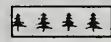
Planned State Units



Proposed cut unit



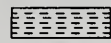
Adjacent proposed units



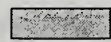
Marten Guidelines Apply



State or Private Land



Existing Harvest Unit



Saltwater and Lakes



1/4 Mile Eagle Nest Buffer

Scale: 1 inch = 1000 feet

Last Updated: March 08, 2000

Alternative	Prescription	Retention	Harvest System	Comments
2	Patch Cut	75	Helicopter	
3 5 6	Patch Cut	70	Helicopter	

Doughnut Timber SaleVolstrata Acres Low 0Medium 23**Unit Number PC2**High 5**Unit Acres 28**Net Volume (MBF/Acre) 22 MBF**Unit Development & Stand Description**

Species composition is 55% hemlock, 15% spruce and 20% yellow cedar. There has been no management in the stand. Western hemlock is common throughout the unit. Spruce is scattered throughout the unit. Yellow cedar scattered and in patches throughout the unit. Unit is located at 1100 to 1400 feet above sea level on 40 to 70% slopes. Dwarf mistletoe is present but not severe. **Alternatives 2:** retains 75%, **Alternatives 3, 5, & 6** retain 70% of the existing trees. Harvest areas (patches) would consist of 3-6 openings not exceeding 3 acres in size. Logs would be helicopter yarded to a landing on Department of Natural Resources land.

	<u>Alt. 2</u>	<u>Alts. 3, 5 & 6</u>
Treatment	Patch Cut	Patch Cut
Percentage of Retention	75%	70%
Leave trees for Marten	Yes	Yes
Harvest Acres	7	8
Harvest Volume (MBF)	154	185
Cable Logging System Acres	0	0
Helicopter Logging System Acres	28	28
Yarded To	DNR land	DNR land

Stand Management Objectives:

Alternatives 2, 3, 5 and 6: Future stand would be predominantly uneven-aged. Harvest this entry would retain a multi-layered stand with 1-3 acre even-aged patches. **Alternative 2** will not remove more than 25% of the existing stand. **Alternatives 3, 5 and 6** may exceed 25% but will retain at least 70%. Remaining volume outside of patch cuts would allow up to 2 other future entries. Natural regeneration is expected in openings.

Water Quality Fisheries

Concern: Unit may contain Class IV tributaries.

Mitigation: Provide full suspension wherever possible across Class IV streams; at least partial suspension is required. (BMPs 13.9, 13.16)

Soils

Concern: No concern

Mitigation:

Wildlife

Concern: High value marten habitat; wildlife corridor; numerous game trails. Eagle nest on State land.

Mitigation: Partial harvest will retain wildlife corridor values. Retain 7 trees >20 inches DBH (4 live trees and 3 decadent) and 3 pieces of downed material with >20" dbh per acre to meet marten standards. Avoid continuous helicopter disturbance within ¼ mile of any active eagle nests.

Visuals

Concern: This unit is visible from the Eastern Passage and Mill Creek Viewpoints. Meet the Partial Retention VQO.

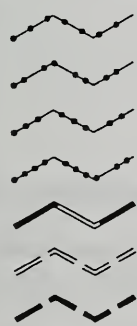
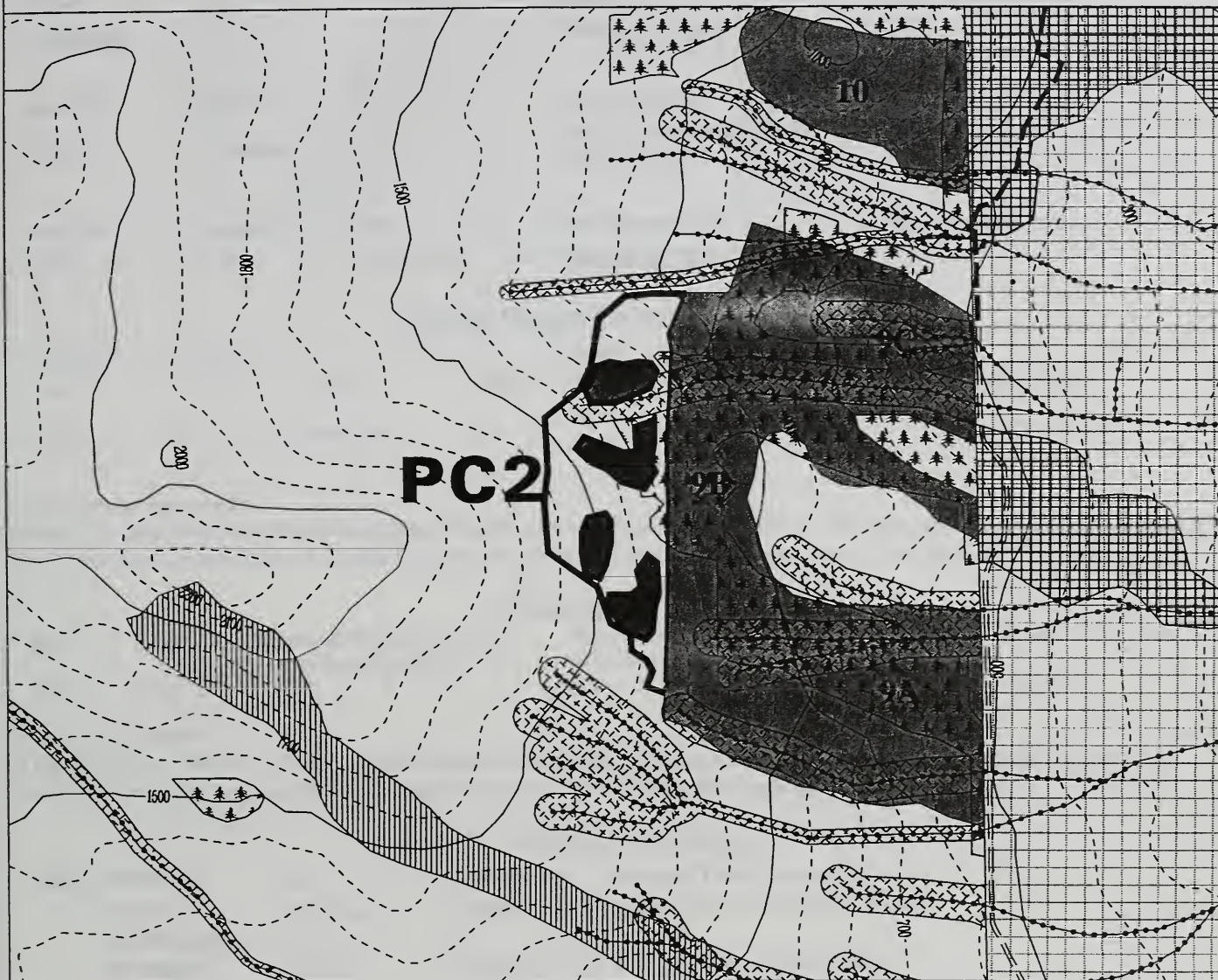
Mitigation: The small sizes of the proposed patches, along with the 70-75% retention proposed will alleviate visual concerns.

Mitigation Measures: F1, F2, F3, F4, F11, F15, F18, F19, T1, T2, W5, W7, W8, W13, W21, W22, W28, W33, H1, H2, H3, V5, V7, and V8

21 ACRES

ALTERNATIVE 3 5 6

UNIT PC2



Eagle Nest Tree



Riparian Buffer



TTRA Buffer



High Hazard Soil



Planned State Units

Scale: 1 inch = 1000 feet

Last Updated: March 30, 2000



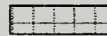
Proposed cut unit



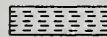
Adjacent proposed units



Marten Guidelines Apply



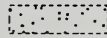
State or Private Land



Existing Harvest Unit



Saltwater and Lakes



1/4 Mile Eagle Nest Buffer

Alternative	Prescription	Retention	Harvest System	Comments
2	Patch Cut	75	Helicopter	
3 5 6	Patch Cut	70	Helicopter	

Appendix B

Road Card

Project Doughnut	System Wrangell Island	Land Use Designation SV
Route No 50055	Route Name Nufie	Begin Terminus MP 0.00 at junction with FDR #6259
End Terminus MP 2.65	Begin MP 1.25	Length 1.4
Status Opportunity	Map Quarter Quad Petersburg (B-1)	Photo year, roll, photos

General Design Criteria and Elements

Functional Class	Service Life	Surface	Width	Design Speed	Critical Vehicle	Design Vehicle
Local	LI	Shot rock	14'	10 mph	Low bed truck	Logging Truck

Intended Purpose/Future Use

Access for recurring silvicultural activities. Will be used for post-sale silviculture activities and future timber management by the Forest Service and State of Alaska Department of Natural Resources on their respective lands.

Maintenance Criteria

Bmp	Emp	Operational Maintenance Level (Planned Initial Condition)	Objective Maintenance Level (Desired Future Condition)	Alaska Forest Practices Act Class
0.00	2.65	2	2	Active

Maintenance Narrative

AFR&P Reg's. "active" status: Keep culverts, catchbasins, ditches and road blocks functional. Grade as needed to maintain crown and running surface. Control roadside brush to maintain sight distance.

Operation Criteria

Highway Safety Act:	No	Jurisdiction:	National Forest ownership
Traffic Management Strategies	Encourage:	Hikers and mountain bikes after timber harvest.	
	Accept:	High clearance vehicles after timber harvest.	
	Discourage:	Passenger vehicles after timber harvest.	
	Eliminate:	Public traffic during timber harvest.	
	Prohibit:	N/A	

Travel Management Narrative

Maintenance Level 2. While the road is at this maintenance level it is open to high clearance highway vehicles and non-highway vehicles. Public travel on this road system is expected to be low.

Approved _____
District Ranger

Date

Appendix B

Road Card

ROAD LOCATION: The main location objective is to stay within productive forest land and National Forest land where possible. New construction starts at MP 1.25, near the end of the existing State road construction. Location is controlled by several stream crossings along the route and steep hillside terrain. The objective was to stay above the wetlands in the lower land as much as possible, access the National Forest land as quickly as possible, and stay off the steep slopes to the west. The road was located as high on the hill as was practical to access timber and avoid wetlands.

WETLANDS: The road crosses sections of wetlands mapped as muskeg/forested mosaic from MP 1.25-1.65. At MP 1.5 there is a major stream crossing. This is a control point; above this point the stream becomes a deep gorge. From MP 1.5 the road climbs as quickly as possible through an open muskeg to reach a bench on the State/USFS boundary. Between MP 1.5-1.65, the road pretty much follows a bench at the base of steep side slopes (50-70%). The steep terrain to the west makes it impossible to avoid locating road on wetlands.

EROSION CONTROL: An erosion control plan for construction and maintenance will be developed by the contractor and approved by the Contracting Officer (BMP 14.5). All areas of organic or mineral soil exposed during construction shall be grass seeded and fertilized (BMP 12.17,14.8).

ROCK PITS: During periods of high rainfall (as defined in current Regional specifications), blasting operations will be suspended at quarries near potentially unstable sites where ground vibration may induce mass movement (BMP 14.6). Borrow for construction will come from an existing pit on State land at MP 4.7 on Rd. 6259.

Site Specific Design Criteria Road 50055

STREAM CROSSINGS:

A) MP 0.06	AHMU Class I	Channel Type MM1	Incision 1 m
Max. Width 2 m	Max. Depth 0.5 m	Gradient 2%	Substrate cobbles
Structure 36" CMP	Passage YES	Timing dates none	

Narrative: Tributary to Hermit Creek, upstream of anadromous fish barrier which may have enhancement potential. Cutthroat trout and Dolly Varden char verified. Existing culvert is slightly perched. Reconstruction will provide fish passage.

B) MP 0.1	AHMU Class I	Channel Type MM1	Incision 1 m
Max. Width 10 m	Max. Depth 1 m	Gradient 2%	Substrate cobble
Structure 60' bridge	Passage YES	Timing dates none	

Narrative: Hermit Creek, upstream of anadromous fish barrier which may have enhancement potential. Cutthroat trout and Dolly Varden char verified. Existing log stringer bridge will be replaced with permanent structure. Reconstruction will provide fish passage and flood flow design.

C) MP 1.5	AHMU Class III	Channel Type HC3	Incision 5 m
Max. Width 7 m	Max. Depth 0.5 m	Gradient 7%	Substrate large cobble/boulder
Structure 50' bridge	Passage NO	Timing dates none	

Narrative: Coal Creek. Road is located to minimize stream incision at crossing site.

D) MP 1.8	AHMU Class III	Channel Type HC5	Incision 5 m
Max. Width 5 m	Max. Depth 0.5 m	Gradient 22%	Substrate bedrock/boulder
Structure 60" or larger cmp	Passage NO	Timing dates none	

Narrative: Tributary to Mom's Creek.

Appendix B

Road Card

OTHER RESOURCE INFORMATION

TIMBER/LOGGING SYSTEMS: Road location is planned to be adjacent to National Forest were feasible. Road location allows access of suitable National Forest land to be harvested by cable-system and to minimize helicopter yarding distances. All timber volume removed in conjunction with the clearing of the road right-of-way is to be from DNR lands.

SOILS/WATER/FISH: See stream crossing information above. There are two Class I stream crossings requiring fish passage. There are two Class III stream crossings. All other stream crossings are Class IV and will require CMPs less than 48" diameter. An unstable Class III tributary to Mom's Creek is located just beyond the end of the proposed road. The stream channel is braided due to shallow incision and debris jams in the vicinity of road crossing. Final road location and structure design should consider two side channels and potential for channel migration.

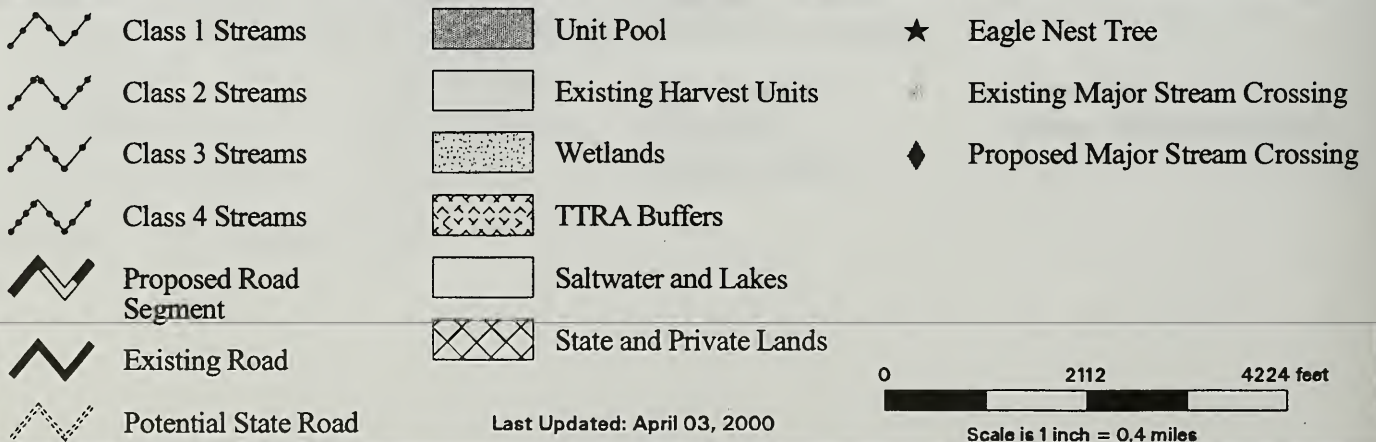
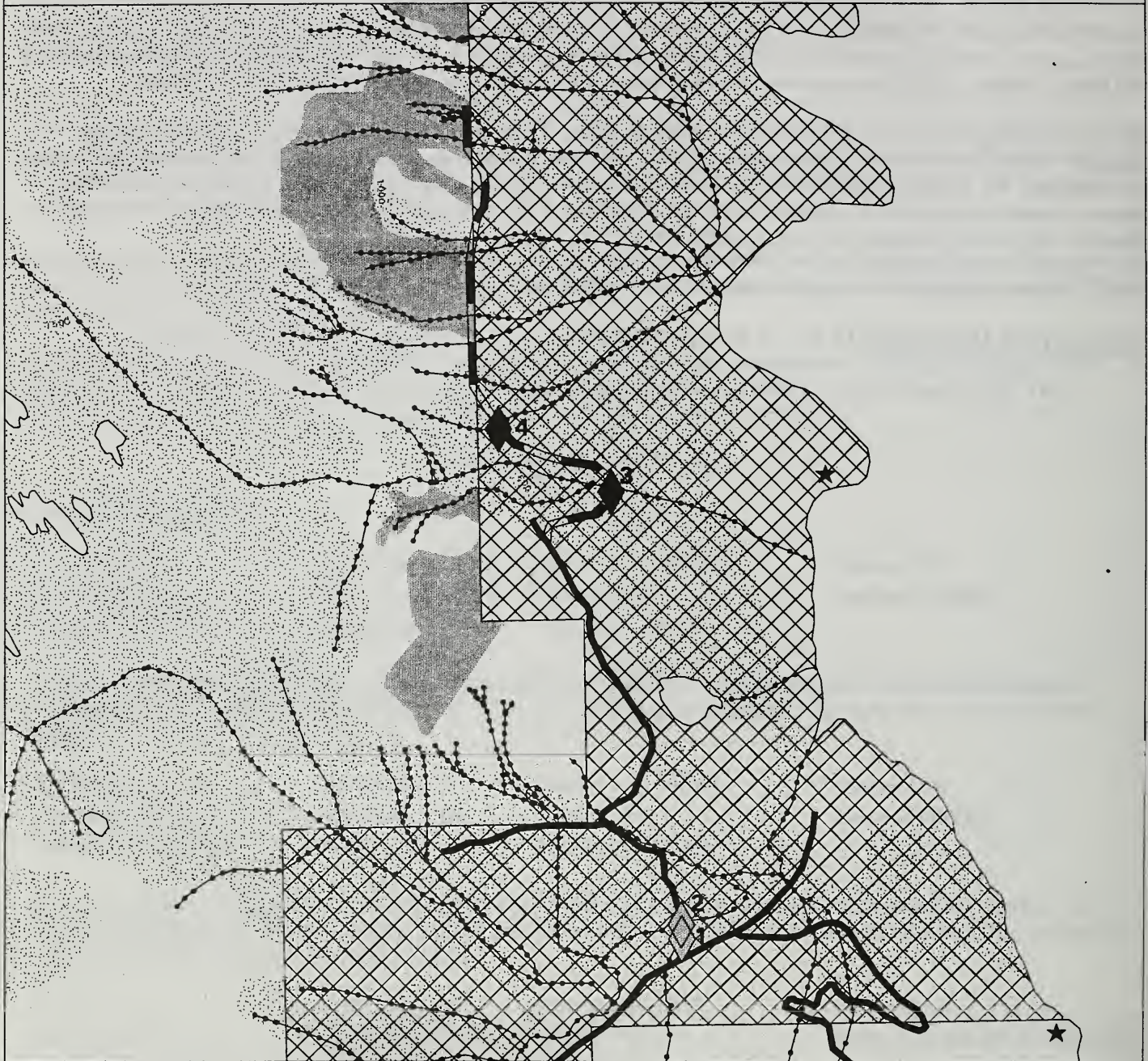
WETLANDS: Disturbance to wetlands adjacent to the road will be minimized.

MITIGATION MEASURES: F6, F7, F8, F9, F10, F12, F13, F16, F17, H1, H2, H3, R2, V9, V10, S1, and S2.

Appendix B

Road Card

ROAD NUMBER 50055



Appendix C

Monitoring and Improvement Projects

Monitoring Plan

Best Management Practice Implementation

Objective: Evaluate application of BMPs for water quality and fish habitat protection.

Method: Follow Tongass National Forest BMP implementation monitoring protocols. All roads and units are inspected for contract compliance by engineering inspector and sale administrator as they are completed. Some Doughnut Timber Sale roads (if built) or units may be randomly selected for interdisciplinary monitoring.

Action: If protection is inadequate, apply corrective measures. If protection measures are inadequate or unsuitable, modify future recommendations.

Accountability: This is a Forest Plan monitoring question as well as a commitment in the Forest Service Memorandum of Agreement with Alaska Department of Environmental Conservation. Wrangell Ranger District watershed staff are responsible for coordinating BMP implementation monitoring with other district personnel.

Cost: \$1000

Best Management Practice Effectiveness

Objective: Evaluate the effectiveness of BMP application at protecting water quality and fish habitat. Due to the concern for maintaining domestic water supplies and sedimentation concerns in Hermit Creek, turbidity monitoring as described in the Forest Plan Monitoring Guidelines is recommended. The objectives of this monitoring will be to determine compliance with state water quality standards for turbidity.

Method: Turbidity will be monitored at all culverts 48 inches or greater on newly constructed roads. Turbidity will be monitored at selected sites in Hermit Creek in consultation with state agencies. Other effectiveness monitoring, if conducted, will address priorities indicated in Forest Plan. Applicable questions include fish passage, stream buffers, landslides, etc. Due to the almost complete absence of fisheries within the project area, and the relatively low occurrence of riparian buffers associated with units, we do not expect this project to lend itself to additional effectiveness monitoring. However, riparian no-harvest buffers may be included in annual Tongass-wide assessments of buffer stability (aerial reconnaissance techniques).

Action: If state water quality standards for turbidity are not achieved, additional mitigation measures will be developed and applied immediately. These could include sediment detention measures such as silt fences or diversion ditches, road grading, aggregate surfacing, or other measures depending on site factors.

Accountability: This is a Forest Plan monitoring question as well as a commitment in the Forest Service Memorandum of Agreement with Alaska Department of Environmental Conservation. Since most of effectiveness monitoring is conducted with Tongass-wide protocols, Wrangell Ranger District watershed and fisheries staff are responsible for coordinating BMP effectiveness monitoring with other Tongass personnel.

Cost: Turbidity monitoring will cost approximately \$1000, possibly more if many sites are monitored.

C - Monitoring and Improvement Projects

Regeneration

Objective: To determine if there is adequate natural stocking after harvest.

Method: Field exams of each unit.

Action: If adequate stocking is not present in any harvest unit, it will be planted to bring stocking up to at least 300 trees per acre.

Accountability: This is a Forest Plan monitoring question and a National Forest Management Act requirement. Wrangell Ranger District silviculture staff are responsible for regeneration exams.

Cost: \$5,000.

Blowdown

Objective: To determine if there is blowdown in stream buffers, reserve clumps, partial harvest units, and along unit edges. Did blowdown occur in areas thought to be susceptible to blowdown?

Method: Aerial flights immediately after and three to five years after harvest.

Action: Where blowdown occurred, assess resource damage through ground reconnaissance as necessary (for example, along streams). Use the results to refine future unit layout.

Accountability: Stream buffer stability is a Forest Plan monitoring question. Other types of blowdown fall under project monitoring questions. Wrangell Ranger District silviculture staff will coordinate with watershed and fisheries staff to schedule flights.

Cost: \$1000

Scenic Resources

Objective: Determine if harvest prescriptions were implemented and effective in meeting the visual quality objectives. Determine how close resulting harvest is to the desired condition.

Method: Before and after photos will be evaluated and site inspections will be made two years following harvest.

Action: Produce a chart showing the number of acres treated, the prescription and the result.

Accountability: This is a project monitoring question, but also addresses a Forest Plan monitoring question. Wrangell Ranger District planning staff will conduct this monitoring.

Cost: \$2000

Wildlife Harvest

Objective: Determine if changes in harvest of big game and furbearers are consistent with predictions in the EIS and subsistence report. Harvest rates are important in assessing whether the supply of game is adequate to meet demand by subsistence hunters and trappers (marten), and to ensure viability of certain species (wolves).

Method: Annually review ADFG harvest data to determine subsistence versus non-subsistence harvest and changes in the rate of harvest over time. If a marked increase or decrease in harvest is observed, consult with ADFG to determine the cause.

Action: If non-subsistence harvest or increasing total harvest trends indicate that future populations may be insufficient to meet subsistence demand, assess hunting regulations and travel management (road access, if roads are built) to determine needed changes.

Accountability: This is a project monitoring question. Wrangell Ranger District wildlife biologist is responsible.

Cost: \$350 per year

C - Monitoring and Improvement Projects

Raptor Nests

Objective: To determine if protection measures are adequate to promote continued use of raptor nests.

Method: The goshawk nests found on Wrangell Island will be visited annually from now until harvest begins, and for not less than two years following harvest to determine if the nest remains active.

Action: If the nest is inactive for two years, protection measures may be removed or the size of the buffer for nests may need to be increased to promote continued use of the nest.

Accountability: This is a project monitoring question. Wrangell Ranger District wildlife staff will conduct the monitoring.

Cost: \$500 annually

Wildlife Habitat

Objective: To compare songbird use in areas with light prescription harvests to nonharvested areas

Method: Off-road point counts within and outside harvest units

Action: Use results to refine future prescriptions or initiate further studies

Accountability: Wrangell Ranger District wildlife biologist is responsible

Cost: \$1000

Marten Leave Trees

Objective: To determine if Forest Plan Standards and Guidelines for marten leave tree retention were met.

Method: Tally number of leave trees >20" dbh within certain units after harvest.

Action: Produce a report showing number of trees required and number left post-harvest for selected units.

Accountability: Wrangell Ranger District Wildlife Biologist is responsible.

Cost: \$2000

Sale Area Improvement

Tree planting - Units that are not adequately stocked within five years after harvest will be planted to increase stocking. Units may also be planted to increase the species diversity of Sitka spruce and Alaska yellow cedar. This project complies with Forest Service K-V Handbook direction (FSH 2409.19) and may be listed in the Doughnut Sale Area Improvement Plan. Tree planting is not likely to occur in harvest units that have a harvest prescription that retains a high percentage of the existing stand.

Due to the concerns for cumulative effects in Hermit Creek, there is a continued need to work with the state on cooperative watershed management and restoration projects. Replacement of the Hermit Creek crossing will be an improvement designed into the timber sale.

C - Monitoring and Improvement Projects

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APPENDIX D

THE REASONS FOR SCHEDULING ENVIRONMENTAL ANALYSIS OF THE DOUGHNUT TIMBER SALE

This Appendix provides a detailed explanation of the rationale for a specific timber sale project and its importance to the multi-year timber program on the Tongass National Forest. To accomplish this, the following questions are answered:

- Why is Timber from the Tongass National Forest Being Offered for Sale?
- What Steps Must Be Completed to Prepare a Sale for Offer?
- How does the Forest Service Develop Expectations about the Market Demand for Timber?
- How does the Forest Service Maintain an Orderly and Predictable Timber Sale Program?
- How Does the Forest Service Decide Where Timber Sale Projects Should be Located?
- How Does This Project Fit into the Tongass Timber Program?
- Why Can't This Project Be Located Somewhere Else?

Coordinated timber sale planning is essential for meeting the goals of the Tongass Land Management Plan and to provide an orderly flow of timber to local industry. To determine the volume of timber to offer each year, the Forest Service can look to current market conditions and the level of industry operations. However, the lengthy planning process—of which this document is a part—requires the Forest Service to rely on projections of future harvest levels to decide how many timber sale projects to begin each year. This document explains how the Forest Service uses information about future markets and past experience with the logistics of timber sale planning to determine the volume of timber that needs to be started through this process each year. Using a detailed timber sale schedule that provides information about each sale as it moves through each stage of the planning process, this Appendix explains the rationale and the necessity for completing this particular timber sale project at this point in time.

Why is Timber from the Tongass National Forest Being Offered for Sale?

National Legislation

On a national level, the legislative record is very clear about the role of the timber program in the multiple-use mandate of the National Forests. The Organic Act of 1897, 16 USC 473-481 (partially repealed in 1976) directed the agency to manage the forests in order to "improve and protect the forest ... [and] for the purpose of securing favorable conditions of water flows, and to furnish a continuous supply of timber for the use and necessities of the citizens of the United States" (emphasis added.) The Multiple-Use Sustained Yield Act of 1960, 16 U.S.C. 528-531, directs the Forest Service to administer federal lands for "outdoor recreation, range, timber, watershed, and wildlife and fish purposes."

The National Forest Management Act of 1976 (16 U.S.C. 472a) states that "the Secretary of Agriculture...[may sell, at not less than appraised value, trees, portions of trees, or forest products located on National Forest System Lands." Although the heart of the Act is land management planning, the Act also sets policy direction for timber management and public participation in Forest Service decision making. Under NFMA, the Forest Service was directed to "limit the sale of timber from each national forest to a quantity equal to or less than a quantity which can be removed from such forest annually in perpetuity on a sustained-yield basis" (16 U.S.C. 1611)

The NFMA directed the Forest Service to complete land management plans for all units of the National Forest System. Forest Plans were to be developed by an interdisciplinary team to provide for the coordination of outdoor recreation, range, timber, watershed, wildlife and fish, and wilderness. The 1979 Tongass National Forest Land and Resource Management Plan was the first to be completed. A revised

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Forest Plan was issued in 1997. With regard to timber production, the Record of Decision for the 1997 Plan stated:

The Tongass National Forest will continue to allow timber harvest while maintaining sustained yield and multiple use goals...Although the maximum amount of timber that could be harvested during the first decade of the Revised Plan implementation is an average of 267 MMBF per year, a level of 200 MMBF or less is more likely to be offered over the next few years, given current market conditions and the transition that both the timber industry and the Forest Service is experiencing. Therefore the public can expect the amount of timber to be offered annually to vary between 200 MMBF or less and 267 MMBF.

...The timber resource will be managed for production of sawtimber and other wood products from timberlands available for sustainable timber harvest, on an even-flow, sustained-yield basis and in an economically efficient manner. We will seek to provide a timber supply sufficient to meet the annual market demand for Tongass National Forest timber and the market demand for the planning cycle...

In April 1999, Under Secretary Jim Lyons elected to modify the 1997 Plan and issue a new Record of Decision (ROD). As stated in the 1999 ROD:

The Tongass National Forest will continue timber harvest consistent with sustained yield and multiple use goals. The forest-wide standards and guidelines for timber include general direction to "[e]nsure that silvicultural systems other than clearcutting are considered through an appropriate project level analysis process. However, uneven-aged management systems will be limited to areas where yarding equipment suited to selective logging can be used"...

Forest-wide, considering all land allocations where timber harvest is permitted, it is estimated that 65 percent of harvesting will involve clearcutting, with the remaining 35 percent utilizing other methods.

...the ASQ for the next 10 years on the Tongass is reduced from an estimated average annual level of 267 MMBF in the 1997 ROD to 187 MMBF in the 1999 ROD, considering both NIC I and NIC II. Although initially this would seem to be a significant reduction in the ASQ, this ceiling for timber harvests from the Tongass remains sufficient to meet all but the most optimistic projections for timber demand and harvests from the Forest for the next decade. I believe that the additional environmental and multiple use benefits provided by this decision should not result in negative social and economic impacts based upon the most current demand for timber.

In day to day operation of the Tongass timber program, the Forest Service attempts to strike a balance among timber availability as documented in the Forest Plan, the market demand for timber in Southeast Alaska, the needs and desires of other forest users, and funding allocations made by Congress.

Alaska-Specific Legislation

Legislation unique to Alaska also directs the Forest Service to maintain a commercial timber program. The Alaska National Interest Lands Conservation Act (ANILCA; P.L. 96-487, 1980) and the Tongass Timber Reform Act (TTRA; P.L. 101-625, 1990) speak directly to the issue of Tongass timber supply. Section 705(a) of ANILCA directed the Forest Service to maintain a timber supply from the Tongass at a rate of four billion five hundred million board feet per decade. To ensure that the timber target was met, Congress provided for a \$40 million annual earmark to fund pre-roading, cultural treatments and innovated logging systems.

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Section 101 of TTRA repealed the timber supply mandate and fixed appropriations of ANILCA and replaced them with the following more general direction:

Sec. 705. (a), Subject to appropriations, other applicable law, and the requirements of the National Forest Management Act (P.L. 94-588); except as provided in subsection 9d) of this section, the Secretary shall, to the extent consistent with providing for the multiple use and sustained yield of all renewable forest resources, seek to provide a supply of timber from the Tongass National Forest which (1) meets the annual market demand for timber from such forest and (2) meets the annual market demand from such forest for each planning cycle.

Timber from the Tongass National Forest is being offered as part of the multiple use mission of the Forest Service as identified in public laws. Alaska-specific legislation and the Forest Plan directs the Forest Service to seek to provide timber to meet market demand subject to appropriations and balancing of forest uses.

What Steps Must Be Completed to Prepare a Sale for Offer?

The timber sale program is complex. A number of projects are underway at any given point in time, each of which may be in a different stage of planning and preparation. A system of checkpoints, or “gates”, helps the Forest Service track the significant milestones of each project from inception to contract termination, followed by monitoring, reforestation, and timber stand improvement. Each project passes through all of the following gates, with the complexity of the sale determining the complexity of the final product at each stage.

Gate 1: Completion of Position Statement. The Position Statement is a brief analysis of the project area with the intent of determining the feasibility of the potential timber sale. This is the first step in the timber sale planning process and it is usually completed from seven to ten years before a sale is offered. After the Position Statement is developed, the Forest Service decides whether to continue to the next phase of the project where a significant investment in time and money will be made.

Gate 2: Sale Area Design, Environmental Documentation and Decision. This phase of the project is commonly referred to as the “NEPA” phase and includes inventory, public scoping, analysis, draft disclosure of the effects of the project on the environment, public comment, final analysis and disclosure, decision, potential appeal, and litigation. Gate 2 activities are generally completed two to six years before a sale is offered. The end product of this phase, an environmental decision document, forms the starting point for the next phase.

Gate 3: Plan Implementation and Field Layout. Gate 3 activities are typically completed one to three years before a sale is offered. During this phase, the information and direction included in the decision document (Gate 2) is used to designate the actual project on the ground. Additional site-specific information is collected at this time.

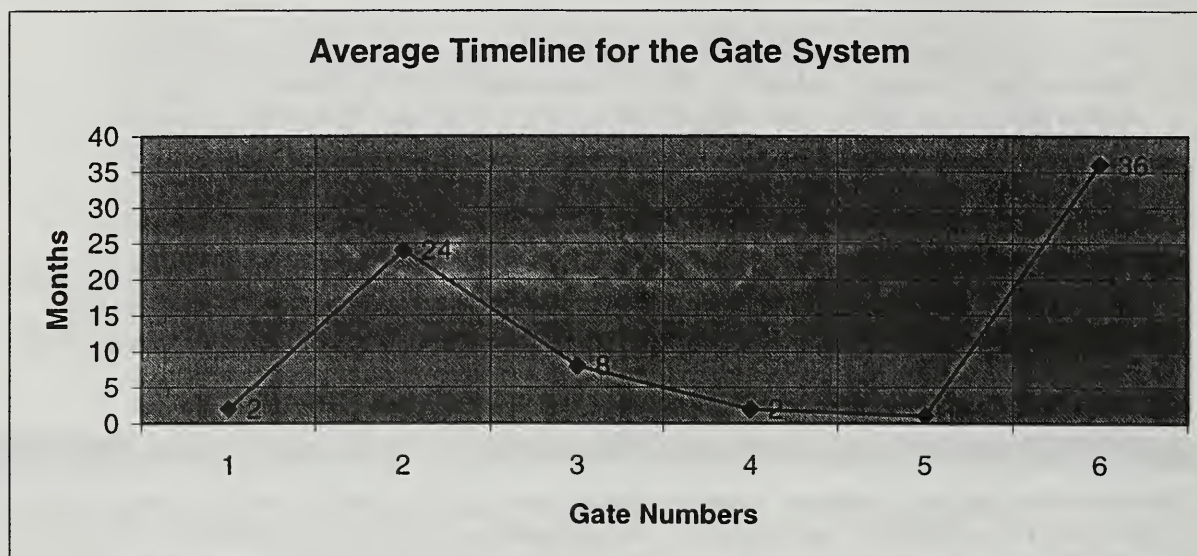
Gate 4: Appraisal Offering Package. The costs and value associated with the timber sale designed in Gate 3 are computed and packaged in a timber sale contract. The contract tells the prospective timber sale purchaser how the sale must be harvested to be in conformance to the project decision document. This phase of the Gate system occurs during the final year of the project development and culminates with the advertisement of the project for sale.

Gate 5: Bid Opening. Gate 5 is completed with the opening of bids for the project. If a bid is submitted, contractual provisions govern when the award of the sale takes place and when the sale will be completed and how timber removal is to occur.

Gate 6: Award. Gate 6 is the formal designation of a contract between a bidder and the Forest Service

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Figure 1.



How does the Forest Service Develop Expectations about Future Timber Markets?

The Tongass National Forest makes two determinations on volume to be offered. The first is a determination on volume to be offered for the current year (annual market demand). The annual market demand is analogous to assessing industry performance in the short-term. In the short-run a firm will make use of its existing equipment to maximize profits or minimize losses. The general approach is to consider the timber requirements of the region's sawmills at different levels of operation and under different assumptions about market conditions and technical processing capability. These assumptions provide a basis for estimating the volume of timber likely to be processed by the industry as a whole in any given year. Timber inventory requirements are acknowledged and estimated in a related calculation. The volume of timber likely to be purchased is equal to the volume needed to make up any inventory shortfall in addition to the volume likely to be harvested in the coming year. The document titled *Evaluating the Demand for Tongass Timber* (USDA, Forest Service, R-10; Morse; September 28, 1998) forms the basis for how these estimates are developed. The document titled *Tongass Timber Sale Procedures* (USDA, Forest Service, R-10; Morse, Draft August 30, 1999) documents actual estimates for the current year. This estimate is what the Tongass plans to offer for the current year of the Ten Year Timber Sale Schedule pending sufficient funding to do so.

Based on the analysis documented in *Tongass Timber Sale Procedures*, for Fiscal Year 2000, the Tongass National Forest plans to offer approximately 148 MMBF for sale. The sales planned for offer will be a combination of new, previously offered, or previously offered and reconfigured. Both standing timber and salvage will be components of the program. Offerings will consist of those targeted for Small Business qualified firms as well as a portion of the volume being made available for the open market.

Use of the Forest Plan Market Demand Over the Planning Cycle

Given the long time involved in preparing a timber sale, the proposed timber sales in this document may not be harvested for 3 to 4 years or longer, not including appeals or litigation. The Forest Service needs some idea of what the long run timber demand will be given cycles in the market. On average what should the Forest Service plan for offer, given that timber from this NEPA document may not be harvested for 4 years into the future? The Forest Service needs to take a long-run view for planning purposes. To answer these questions the Forest Service asked the Pacific Northwest Research Station for professional assistance.

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As the Tongass Land Management Plan was being revised in 1997, research economists at the Pacific Northwest Research Station (PNW) were asked to update their earlier projections of Alaska timber products output and timber harvest by ownership. The most recent projections of timber harvest over the planning cycle account for several dramatic changes in the region's manufacturing capabilities, increased competition from a number of sources, and the steady erosion of North America's share of Japanese timber markets.

The Tongass documents these projections and the means of implementation through the issuance of a Ten Year Timber Sale Schedule. Each year this plan is updated whereby the current year is dropped at the culmination of the fiscal year and a new year ten is added. The basis for this schedule is long range timber market projections documented in the publication titled *Timber Products Output and Timber Harvest in Alaska: Projections for FY97-10* (Brooks and Haynes; PNW-GTR-409, September, 1997). These projections of Alaska timber products output, the derived demand for raw material, and timber harvest by owner are developed from a trend-based analysis. These projections reflect the consequences of recent changes in the Alaska forest sector and long-term trends in markets for Alaska products. With the closure of the two southeast Alaska pulp mills, demand for Alaska National Forest timber now depends on markets for sawn wood and the ability to export manufacturing residues and lower grade logs. Three alternative projections are used to display a range of possible future demand (Table 1). Areas of uncertainty include the prospect of continuing changes in markets and in conditions faced by competitors and the speed and magnitude in investment in manufacturing in Alaska.

Demand projections are important for program planning. They provide important guidance to the Forest Service for requesting budgets, for making decisions about workforce and facilities, and for indicating the need to begin new NEPA analysis for future program offerings. They also provide a basis for expectations regarding future harvest, and thus provide an important source of information for establishing the schedule of probable future sale offerings. The weight given to the projections will vary depending on a number of factors, such as how recently they were done, and how well they appear to have accounted for recent, site-specific events in the timber

Table 1-Projected National Forest Harvest

For Fiscal Year 2001-2009, the Tongass National Forest plans to schedule approximately 160 MMBF for sale each year over the life of the Forest Plan. This schedule is based on the projections documented in *Timber Products Output and Timber Harvest in Alaska: Projections for FY97-10* (Brooks and Haynes; PNW-GTR-409, September, 1997), and current volumes in the timber sale pipeline process. Prior to the beginning of Fiscal Year 2001 the amount of volume scheduled in outyears will once again be analyzed to determine if projections made now meet the anticipated needs in the future.

Fiscal Year	Projected Harvest (MMBF)		
	Low	Medium	High
2000	95.5	116.6	142.7
2001	104.6	129.0	157.7
2002	113.7	134.9	173.1
2003	122.8	140.8	188.9
2004	131.9	146.5	205.0
2005	131.9	152.2	221.4
2006	131.9	157.8	238.2
2007	132.0	163.4	255.3
2008	132.0	168.9	272.8
2009	132.1	174.3	290.7
Average	122.8	148.4	214.6
Mean	168.7		

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How does the Forest Service Maintain an Orderly and Predictable Timber Sale Program?

Pools of Timber (Pipeline Volume)

As discussed earlier, the Forest Service tracks accomplishment of various stages of development of each timber sale with the Gate System process. From a timber sale program standpoint, it is also necessary to track and manage multiple projects through time as projects collectively move through the Gate System. Tracking of the multiple projects can be likened to following various segments of several projects through a pipeline of time. Because of the relatively long timeframes needed to accomplish a given timber sale and the complexities inherent in timber sale project and program development, it is necessary to track various timber sale program volumes from Gate 1 through Gate 6. Gate 1 volume represents a large pool of program volume, but represents a relatively low investment from project to project. This relative investment level offers the timber program manager a higher degree of flexibility and thus, does not greatly influence the flow of volume through the pipeline. In addition, tracking of how much volume near the end of the pipeline that is in appeals or litigation may be necessary to determine potential effects on the flow of potential timber sales.

The goal of the Tongass National Forest is to provide an even flow of timber sale offerings on a sustained yield basis. In past years, this has been difficult to accomplish due to continual reductions in the suitable timber land base, reductions in the timber industry processing capabilities, rapid market fluctuations and Forest Plan modifications and litigation. To achieve an even flow of timber sale offerings, 'pools' of projects in various stages of the Gate System will be maintained so volume offered can be balanced against current year demand and market cycle projections. Today, upward trends in demand are reacted to by moving outyear timber projects forward leaving outyears not capable of meeting the needs of the industry. In other instances, a number of new projects are started based on today's market but not available for a number of years. By the time the added projects are ready for offer, the market and demand for this volume has changed. Three pools are being tracked to achieve an even flow of timber sale offerings:

1. Timber volume under analysis (Gate 2): Timber volume under analysis, contains sales being analyzed and undergoing public comment through the NEPA process. This process can often take from one to five years and reaches a significant milestone when a NEPA decision is made. This pool includes any project with a formal Notice of Intent through those with a decision document issued. Volume in appeals and litigation will be tracked as a subset of this pool as necessary.

2. Timber volume available for sale (Gate 3, Gate 4 and Gate 5): Timber volume available for sales, contains sales for which environmental analysis has been completed, and administrative appeals, and litigation (if any) have been resolved. They have also been fully prepared, and are available to managers to schedule for sale offerings. Managers need to maintain enough volume in this pool to be able to schedule future sale offerings in an orderly manner of the size and configuration that best meets the need of the public. As a matter of policy, and sound business practice, the Forest Service attempts to announce probable future sale offerings at least one year in advance. This allows potential purchasers an opportunity to do their own evaluations of these offerings in order to determine whether to bid, and if so, at what level.

3. Timber volume under contract (Gate 6): Timber volume under contract contains sales which have been sold and a contract awarded to a purchaser, but have not yet been fully harvested. Timber contracts typically, but not always, give the purchaser three years to harvest and remove the timber purchased. Long standing Forest Service practice is to attempt to maintain about two to three years of unharvested timber volume under contract to timber purchasers. This volume of timber is the industry's dependable timber supply which allows immediate flexibility in business decision. This practice is not limited to the Alaska Region, but is particularly pertinent to Alaska because of the nature of the land base. The relative absence of roads, the island geography, the steep terrain, and the consequent isolation of much of the timber land means that timber purchasers need longer-than-average lead times to plan operations, stage equipment, set up camps, and construct roads prior to beginning harvest.

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What drives the various timber sale program pipeline pool volume is a combination of actual harvest and projected demand. As purchasers harvest timber, they deplete the volume under contract. Managers track harvest, and offer sales that give the industry as-a-whole the opportunity to replace this volume and build or maintain their working inventory. Although there can be significant variation for practical reasons from year to year, in the long-run, over both the high points and low points of the market cycle, timber harvest will equal timber sales.

The amount of pipeline volume in each of the pools is determined by the Forest Service based on historical patterns. Table 2-Pools Matrix displays what volume levels are expected to be maintained in each pool. Pool 1-Timber Volume Under Analysis is expected to be maintained at approximately 4.5 times the amount of anticipated harvest; Pool 2-Timber Volume Available for Sale is expected to be maintained at approximately 1.3 times the amount of anticipated harvest, and Pool 3-Volume Under Contract is expected to be maintained at approximately 3 times the amount of anticipated harvest. The objective of the pools concept is to maintain sufficient volume in preparation and under contract to be able to respond to yearly fluctuations in a timely manner.

Table 2- Pipeline Pool Matrix

Pipeline Pool Volume	Flows	Start of Year One	During Year One	End of Year One
1. Volume Under Analysis (Gate 2)		238	401	230
	NEPA Decision	126	343	171
2. Volume Available for Sale (Gate 3, Gate 4 and Gate 5)		79	266	159
	Offered		163	
	Sold		148	
3. Volume Under Contract (Gate 6)		325		352
	Volume Harvested*		121	
*Note-The amount of volume estimated to be harvested for the year sets the basis for what will be maintained in Pools 1-3 (Gates 2 through 6). Should this estimate be incorrect, adjustments can be made in the following years without significant departures in outyear programs capabilities.				

Matrix crosswalk between Gate Tracking System and Pools of Timber Concept:

Gate 2: Proposed timber volume with a published decision document (Record of Decision) that is viable for sale after completion of appeals and litigation.

Gate 3: NEPA cleared timber volume with field preparation work completed and the timber sale ready to be offered in a timber sale contract package.

Gate 6: Timber volume under contract.

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Table 2a- Volume in Appeals and Litigation

Timber volume in appeals and/or enjoined in litigation *.	55	Million Board Feet
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*As of September 30, 1999. The volume in appeals and or enjoined in litigation is updated on a quarterly basis.

How Does the Forest Service Decide Where Timber Sale Projects Should be Located?

The Allowable Sale Quantity (ASQ)

The Modified 1997 Forest Plan Record of Decision established an ASQ for timber at 1.87 billion board feet per decade which equates to an annual average of 187 million board feet (MMBF). The ASQ serves as an upper limit on the amount of timber that may be offered for sale as part of the regularly scheduled timber sale program. It consists of two separate Non-Interchangeable Components (NIC's) called NIC I, which is 1.53 billion board feet of timber per decade, and NIC II, which is .34 billion board feet per decade. The purposes of partitioning the ASQ into two components are to maintain the economic sustainability of the timber resource by preventing the over-harvest of the best operable ground, and to identify that portion of the timber supply that is at risk of attainment because of marginal economic conditions. The NIC I component includes lands that can be harvested with normal logging systems. The NIC II component includes land that has high logging costs due to isolation or special equipment requirements. Most of these NIC II lands are presently considered economically and technically marginal.

Immediately following the issuance of the Modified 1997 Forest Plan Record of Decision by the Deputy Under Secretary of Agriculture, James Lyons, the Forest Service began an analysis of the ROD to develop consistent methodologies for its implementation (Implementation of Tongass Land Management Plan, 1920/1950, James A. Bartelme, Forest Supervisor, May 11, 1999). The purpose of the analysis was to develop methodology to ensure the modified Forest Plan changes received a consistent implementation approach across the Tongass, and to determine where the land base existed to begin programming current and future timber sale projects.

The Tongass National Forest has been unified under one Forest Supervisor overseeing the three combined Administrative Areas (Chatham, Stikine and Ketchikan). The allowable sale quantity is disaggregated by Ranger District offices for planning and scheduling purposes. Each District has been allocated a portion of the timber harvest program based on the FORPLAN computer run and availability of suitable and available acres, to implement the Forest Plan, and Section 101 of the Tongass Timber Reform Act (1990). The Forest Plan set the Forest allowable sale quantity (ASQ) upper limit at 187 MMBF per year. The distribution of the planned ASQ harvest among the Districts is listed in Table 3 (All volumes are identified as sawlog plus utility):

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Table 3-Distribution of ASQ Among the Tongass National Forest Ranger Districts

Historically, timber harvest activities were generally concentrated in the central and southern portions of the Tongass. Now, under the Modified 1997 Forest Plan, the suitable timber land base is more evenly distributed across the Forest. As a result, it is necessary to lessen harvest on the southern end and begin planning projects in areas further north. In answer to the question presented for this section of the Appendix, the suitable timber base is capable of producing the ASQ documented in the Modified 1997 Forest Plan Record of Decision. However, harvest activities will be more evenly distributed than they were in the past.

Tongass NF Ranger District	Non-Interchangeable Components	
	NIC I	NIC II
Ketchikan	18	4
Thorne Bay	21	5
Craig	18	4
Wrangell	24	4
Petersburg	37	8
Sitka	12	3
Hoonah	6	2
Juneau	12	3
Yakutat	5	1
Admiralty	0	0
NIC Totals	153	34
ASQ Total	187	

Chart 1- 1997 Modified Forest Plan Land Allocations

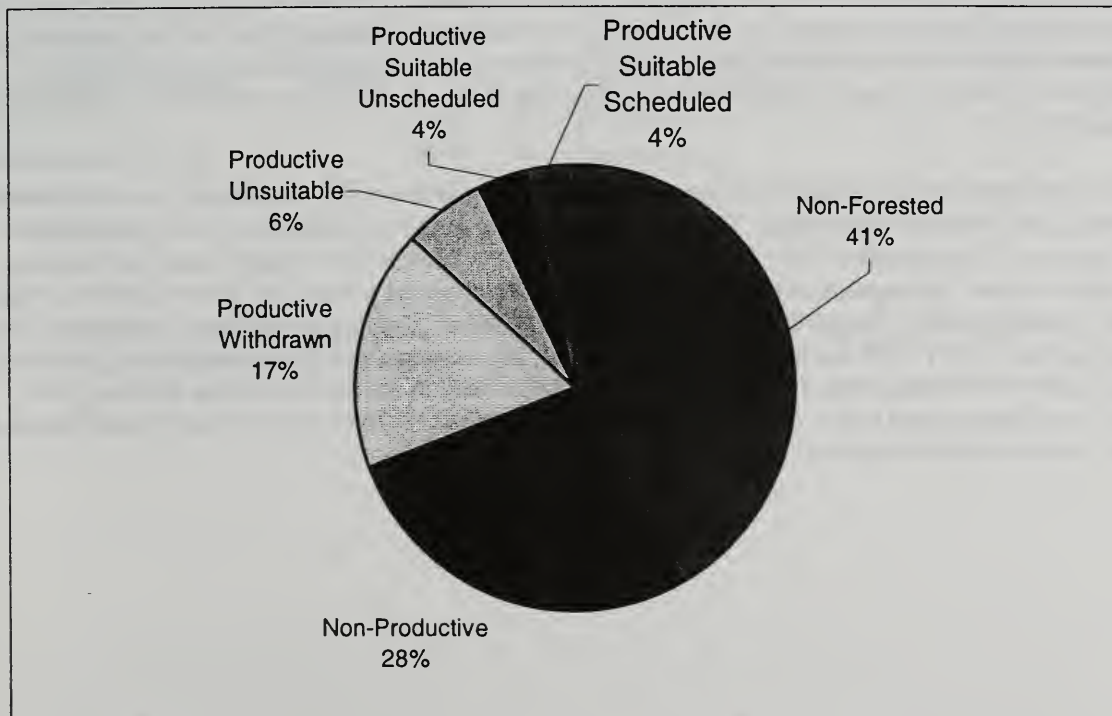


Chart 1- 1997 Modified Forest Plan Land Allocations depicts the productive suitable land base that is scheduled for timber harvest activities. Four percent of the Tongass land base generates the allowable sale quantity of 187 MMBF per year. The remainder of the land, approximately ninety-six percent, does not allow or will not support timber harvest activities.

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District-Level Planning

The Forest Supervisor for the Tongass National Forest has discrete responsibilities for the overall management of the Forest's timber sale program. Included within these responsibilities is making the determination on the amount of timber volume to be made available to the industry as described above. Once a determination is made for the current year (annual demand) offer level, the information is presented to Congress via the Regional Forester and Chief of the Forest Service. Whether or not funding is appropriated to attain the program is the responsibility of the Congress and the President of the United States.

While the debate on funding takes place, the Tongass Forest Supervisor directs the District Rangers to formulate timber sale schedules that attain the prescribed offer level for the current year as well as develop outyear timber programs based on projected market demand for the planning cycle. It is the Ranger's role to recommend to the Forest Supervisor timber sale projects that meet forest plan goals and objectives. Districts work on various projects simultaneously resulting in continual movement of projects through the stages of the timber program pipeline. Their schedule allows the necessary time to complete preliminary analysis, resource inventories, environmental documentation, field layout preparations and permit acquisition, appraisal of timber resource values, advertisement of sale characteristics for potential bidders, bid opening, and physical award of the timber sale. Once all of the Rangers' recommendations are made and compiled into a consolidated schedule, the Forest Supervisor is responsible for the review and approval of the final plan.

Pending Congressional appropriations, the sale schedule is implemented. In the event insufficient funds are appropriated to achieve the desired outputs, timber sale projects are selected and implemented on a priority basis. Generally, the higher priority projects include sales where investments such as, road networks, camps or log transfer facilities have already been established. Those sales that are not implemented or only partially implemented are moved to the outyears. The sale schedule becomes very dynamic in nature due to the number of influences on each of the districts. A formal review of the schedule is done annually by the Forest Supervisor in consultation with the District Rangers, and amendments are made as needed through the course of the year. (The Tongass Timber Sale Plan is located on the Tongass National Forest Website)

The National Forest Management Act requires the Forest Service to develop timber sale schedules that encompass the life of the forest plan. The recent Tongass National Forest planning process culminated upon issuance of the Modified 1997 Forest Plan Record of Decision for the Tongass Land and Resource Management Plan. In response to this Plan, the Tongass has prepared a Ten Year Timber Sale Schedule for Fiscal Years 2000-2009. Fiscal Year 2000 offer level is based on annual market demand estimates. The remaining years, 2001-2009 are based on market demand projections over the planning cycle. Table 4- Tongass Ten Year Timber Sale Schedule-Fiscal Year 2000, denotes the first year of the ten-year plan. Fiscal Year 2000 is listed below to show the reader an example of the information available and display the timber sales scheduled for the current fiscal year.

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Table 4-Tongass Ten Year Timber Sale Schedule-Fiscal Year 2000

			S+U	Sale	Vol S+U		FY00		
						Class	Gate	Gate	Gate
Project	Date	RD	(MMBF)	Name	(MMBF)			3	5
Sea Level EIS	May-99	KRD		Madder	26	S			26
Sea Level EIS	x	KRD		Buckdance	11	S			11
Sea Level EIS	x	KRD		Orion	13	S			13
Craig Small Sales EA	x	CRD	1.5	Craig Small Sales	1.5	S	1.5	1.5	1.5
TNB Small Sales EA	x	TNB	5	Various	5	S	5	5	5
Luck Lake EIS	Jan-00	TNB	13	Luck Lake	5	S	13	5	5
Luck Lake EIS	x	TNB		Twin Bridge	8	S		8	8
Couverdan CE	Jun-00	JRD	0.8	Couverden Salvage	0.8	S	0.8	0.8	0.8
8-FATHOM EIS	Apr-96	HRD		Midway	6.4	S		6.4	6.4
HRD Small Sales EA	x	HRD	0.2	Small sales	0.2	S	0.2	0.2	0.2
NW BARANOF EIS	Feb-96	SRD		Schultz	8	S		1	8
Small Salvage Sale CE	x	YRD	0.2	Small Salvage Sale-00	0.2	S	0.2	0.2	0.2
Woodpecker EIS	(May-00)	PRD	(5-18)	Woodwork	1	S	18	1	1
Twin Creek EA	Aug-98	PRD		Twin Creek heli (41,66)	1.5	S		1.5	1.5
Twin Creek EA	Aug-98	PRD		Twin Creek 15	0.1	S		0.1	0.1
South Lindenberg EIS	Dec-96	PRD		South Central (U140)	1.5	S		1.5	1.5
South Lindenberg EIS	Dec-96	PRD		S.Lindy SE	10	S		10	10
East Fork EA	Jul-88	PRD		East Fork	2	S		2	2
Bohemia Mountain EIS	Jun-95	PRD		Goose (Unit 538)	1	S		1	1
Doughnut EA	x	WRD	8	Doughnut	4	O	8	4	4
Skipping Cow EIS (X)	x	WRD	20	Skipping Cow	20	S	20	20	20
Kuakan EIS	x	WRD	12	Kuakan	12	S	12	12	12
Total			40		138.2		40	81.2	138.2

NOTE: The difference between projected volume (148 MMBF) and offer volume (138 MMBF) will be made up from re-offer/reconfigured unsold FY 98/99 timber sales.

Appendix D – Reasons for Scheduling the Environmental Analysis

The Ten Year Schedule provides a significant amount of information and is described as follows:

Title	Description
NEPA Project	Environmental document project name. This name may or may not differ from the timber sale project name depending on how many sales originate from the original NEPA document.
Decision Date	The date of the decision document whether planned or actual. 'x' denotes project has started and completion is within the FY noted under column H.
RD	Ranger district office project is located (PRD=Petersburg Ranger District).
S+U (MMBF)	Anticipated timber volume (sawlog plus utility) expected from the NEPA document. Generally only appears once in the year the decision is made. If no volume shown, decision on document was made in another fiscal year.
Sale Name	Timber sale project name.
Vol S+U (MMBF)	Timber sale project volume (sawlog plus utility).
Class	Timber sale size class determination (S-SBA, O=open sale to all bidders).
FY00 Gate 2 (NEPA)	Only appears in the year the NEPA document will be decided. Number designates potential volume.
FY00 Gate 3 (Layout)	Only appears in fiscal year sale is to be laid out and appraised. May appear in more than one year.
FY00 Gate 5 (Offer)	Only appears in fiscal year sale is to be offered. Number designates potential volume.

The location of timber sale projects are based on the land allocation directed in the Forest Plan decision. Timber sales are located where permitted based on the prescription and objectives of the land use designation. Timber sale projects are located to varying degrees in land use designations identified as timber production, modified landscape, and scenic viewshed.

As stated earlier, the District Ranger is responsible for identifying and recommending the project areas for the Ten Year Timber Sale Schedule. The considerations the Ranger makes on each project includes but are not limited to the following:

1. The project area contains a sufficient number of acres allocated to development land use designations to make timber harvest in the area appropriate under the Forest Plan. There is an adequate amount of suitable and available land for timber harvest opportunities. Available information indicates harvest of the amount of timber volume being considered for this project can occur consistent with the Forest Plan standards and guidelines and other resource protection requirements.
2. The project and proposed timber harvest volume can contribute to achieving the goals and objectives of implementing the Forest Plan.
3. The potential investment in infrastructure (roads, bridges, log transfer facilities, camps, rock pits, etc.) is necessary for sustainable timber harvest offerings. Where infrastructure already exists, this project will enable maintenance and upgrade of the facilities, which is necessary for removal of timber volume.
4. The potential effects on subsistence and other resources.
5. Based on current year and anticipated outyear timber volume demand; volume currently under contract; anticipated Congressional allocations; and the availability of resources to fully prepare and offer this project for sale, this project is consistent and meets Forest Service Policy in the

Appendix D – Reasons for Scheduling the Environmental Analysis

Alaska Region, Regional Guide; Best Management Practices; the Modified 1997 Tongass Land and Resource Management Plan; and all other laws and regulations governing the removal of timber from National Forest System Lands.

How Does This Project Fit into the Tongass Timber Program?

The Doughnut Timber Sale Project is scheduled for offer in Fiscal Year 2000 (Tongass National Forest Ten Year Timber Sale Schedule, approved by Thomas Puchlerz, Forest Supervisor, dated 10/28/1999). Forest-wide, total offer volume being planned for Fiscal Year 2000 is 168 MMBF. In order to achieve the planned offer date, the Doughnut Timber Sale Project has a scheduled Gate 2 completion date of Fiscal Year 2000 with Gate 3 implementation to begin in Fiscal Year 2000.

The Doughnut Project is currently in Gate 2, "Volume Under Analysis". The project's action alternatives being addressed in the NEPA analysis range from 2 MMBF to 8 MMBF that could contribute to the Tongass Timber Sale Program. As described earlier, the volume of timber needed to maintain this pool is 343 MMBF. Potential selection of an action alternative for this project would bring the volume in the NEPA decision pool between 164 MMBF to 170 MMBF. Therefore, the Doughnut Project is consistent with program planning objectives and necessary to meet the goal of providing an orderly flow of timber from the Tongass on a sustained yield basis. Given the included information, it is reasonable to be conducting the environmental analysis for this project at this time.

Why Can't This Project Occur Somewhere Else?

As previously discussed, the market demand for timber for the next ten years is expected to average 160 MMBF per year. The suitable and available land base on the Tongass is capable of supporting an Allowable Sale Quantity of 187 MMBF annually, 153 MMBF of which is considered economical (i.e. the NIC I component). Based on the projected market demand for the planning cycle, all suitable timberlands will eventually be scheduled for harvest to meet the current and projected demand for raw material in Southeast Alaska. The cumulative impact on other resources from past harvest activities, the location of timber sales under contract, and the eventual use of all suitable lands for timber sale projects makes the relocation of this project in another area inefficient and potentially contrary to the standards and guidelines of the Forest Plan.

- Areas with available timber will be necessary to consider for harvest in order to seek to provide a supply of timber from the Tongass National Forest which (1) meets the annual market demand for timber from such forest and (2) meets the market demand from such forest for each planning cycle, pursuant to Section 101 of the Tongass Timber Reform Act (TTRA).
- The potential effects on subsistence resources are projected to differ little based on the sequence these areas are harvested. Harvesting other areas with available timber on the Tongass National Forest is expected to have similar potential effects on resources, including those used for subsistence, because of widespread distribution of subsistence use and other factors. Harvest within other areas is foreseeable, in any case over the forest planning horizon under the Forest Plan.
- Providing substantially less timber volume than required to meet Forest Plan and TTRA Section 101 timber supply and employment objectives in order to avoid harvest in the project area is not necessary or reasonable.
- It is reasonable to schedule harvest in the project area rather than in other areas at the present time based on previous harvest entry and access, level of controversy over subsistence and other effects, the ability to complete the National Environmental Policy Act (NEPA) process and make timber available to meet the needs of dependent industries. Other areas that are reasonable to consider for harvest in the near future are the subject of other project EIS's that are currently ongoing or scheduled to begin soon.

APPENDIX D

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Appendix E

Mitigation Measures

These general measures may apply to all units and roads in a project area and/or they may apply to other portions of a project area. The source(s) of each general measure are listed after the measure in terms of individual Forest-wide Standards and Guidelines (see Chapter 4 of the Forest Plan) or BMPs (see Appendix C of the Forest Plan and Chapter 10 of FSH 2509.22, The Soil and Water Conservation Handbook). Specific mitigation measures that are applied to selected units and/or roads in a project are identified in the section that follows the general measures.

Air Quality Protection: Design projects to control air pollution impacts and to ensure that the predicted emissions from all pollution sources do not exceed ambient air quality standards, as specified under the Alaska Administration Code, Title 18, Chapter 50; burning permits will be obtained from ADEC for all fire projects. (AIR 112).

Soil/Water Protection during Timber Sale Planning: Incorporate soil and water resource considerations into timber sale planning. Include site-specific considerations, site preparation, designating water quality protection needs on sale area maps, locating and designing landings for good drainage and dispersion of water, incorporating erosion control and timing responsibilities into the Operating Schedule, scheduling and enforcement of erosion control during and at completion of the timber sale, including non-recurring "C" provisions to protect soil and water resources in timber sale contracts, and seeking an environmental modification of the contract if new circumstances or conditions indicate that soil, water, or watershed damage may occur. (BMP 13.1, 13.2, 13.3, 13.4, 13.10, 13.11, 13.12, 13.14, 13.17, and 13.18)

Soil/Water Protection during Road Development: Implement measures to reduce surface erosion and drainage interruption related to transportation including water barring and cross-draining roads using ditches and culverts to prevent water running long distances over roads, closure, and seeding and fertilizing cut-and-fill slopes. (BMPs 14.1, 14.2, 14.3, 14.5, 14.7, 14.8, 14.9, 14.10, 14.11, 14.12, and 14.19)

Soil/Water Protection during Road Management: Conduct road maintenance and snow removal operations to minimize disruption of road surfaces, embankments, ditches, and drainage facilities, and use road closures or other measures to keep road surface and road site erosion at low or background levels. (TRAN23-I, BMPs 14.20 and 14.23)

Temporary Road Obliteration: Obliterate temporary roads after use, remove or bypass drainage structures and install waterbars in appropriate places. (RIP2-II and BMPs 12.17 and 14.24)

Soil/Water Protection during Development of Rock Sources: Implement measures to reduce surface erosion and other impacts on soils and water from gravel sources and quarries, sort yards, and other facilities. (BMPs 14.18, 14.19, 14.25, 14.26, and 14.27)

Accidental Spills: Implement measures and plans to prevent the contamination of soil and water from accidental spills of petroleum products and hazardous substances. (BMP 12.8 and 12.9)

Heritage Site Discovery: Suspend work if a heritage site is discovered during project implementation. Authorize resumption of work only after consultation with the State Historic Preservation Office is complete.

Maximum Size of Created Openings: Limit created openings to a maximum size of 100 acres. (TIM114-IV)

E – Mitigation Measures

Certification of Reforestation: Certify that every unit that receives a final harvest meets or surpasses the stocking guidelines and certification standards (FSH 2409.17) within 5 years. (TIM24)

Wetland Protection: Minimize the loss of all wetlands, but particularly the higher value wetlands (especially fens), and minimize the adverse impacts of land management activities on wetlands; follow Executive Order 11990 and the BMPs. (WET-I, WET-III, BMP 12.5)

Site-specific Mitigation Measures Incorporated into Unit and Road Design

Tongass National Forest

The specific mitigation measures that are applied to selected units and/or roads in a project are identified in this section. The source(s) of each general measure are listed after the measure in terms of individual Forest-wide Standards and Guidelines (see Chapter 4 of the Forest Plan) or BMPs (see Appendix C of the Forest Plan and Chapter 10 of FSH 2509.22, The Soil and Water Conservation Handbook).

FISH, WATER, & SOILS

F1 Riparian Buffers: Establish no-harvest and selective cut buffers along streams and around lakes to protect riparian areas as defined by the Riparian Standards and Guidelines. Protect buffers from adjacent harvest activities (e.g., directional felling, split yarding, suspension requirements). (RIP2, BMP 12.6)

F2 Directional Felling Along Buffers: Trees identified for harvest will be felled to avoid riparian areas designated for “no commercial harvest” and stream courses. (RIP2-II)

F3 Class III/IV Stream Protection: Split yard and directionally fall trees away from Class III and IV streams without buffers. (RIP2-II)

F4 Yarding Across Streams: Fully suspend logs where yarding is to be done across streams or the full length of a stream or drainage. (RIP2-II)

F5 Fish Passage: Maintain fish passage at Class I and II stream road crossings using properly designed stream-crossing structures (consult the Aquatic Habitat Management Handbook, FSH 2609.24). (FISH112-IV)

F6 Use of Bridges: Install bridges at designated stream crossings to minimize the amount of sediment entering streams and/or to ensure good fish passage (TRAN 214-II).

F7 Instream Construction Timing Restrictions: Implement timing restrictions for instream construction activities for the protection of anadromous and resident fish. (RIP2-II and BMPs 14.6, 14.10, 14.14, and 14.17)

F8 Siting of Road-Stream Crossings: Modify the location of road-stream crossings to correspond with stable stream reaches. (TRAN214-II)

F9 Routing of Roads near Streams: Modify road routes to avoid locations near fish-bearing streams. (TRAN214-II)

F10 Routing of Roads through Wetlands and Other Sensitive Areas: Modify location of Forest Development Roads to minimize impact to wetlands, floodplains, estuaries, and tidal meadows. (TRAN214-III)

F11 Harvesting Timber in/near Wetlands and Floodplains: Modify unit design or logging system to avoid or minimize damage to muskegs, other wetlands, or floodplains. (S&W112-I, BMP 12.4 and 12.5)

E – Mitigation Measures

F12 Management of Road Use to Reduce Erosion and Sedimentation: Control access and manage road use to reduce the risk of erosion and sedimentation from road surface disturbance especially during the higher risk periods associated with high runoff and spring thaw conditions. (BMP 14.22)

F13 Storm-proofing Roads: Design system roads with oversized culverts, outfall riprap, armored dips adjacent to culverts, substantial ditch blocks, drivable waterbars, and/or other measures to prevent culvert failure or erosion during periods of inactivity. (TRAN22-I)

F14 Road Storage: Establish self-maintaining drainages across roads, remove bridges and reestablish natural drainage patterns, and establish vegetation cover on the road to prevent erosion during periods of inactivity. (TRAN22-I)

F15 Avoid Harvesting Very High Hazard Soils: Modify unit design to avoid very high mass movement areas, including slopes > 72%. (S&W112-I, BMP 13.5)

F16 Avoid Road Development on Very High Hazard Soils: Avoid road construction along unstable slopes, including slopes > 67%. (S&W112-I and BMP13.5)

F17 Soil/Water Protection along Roads on Very High Hazard Soils: Where avoidance of road construction along unstable slopes is not possible, take special precautions with fill to prevent soil erosion, stream sedimentation, and mass wasting or require full bench construction and end hauling of excavated material. (S&W112-I, TRAN 214-II, and BMP 14.7)

F18 Suspension Requirements to Protect Soils: Use partial- to full-suspension logging systems in areas with high mass movement potential or McGilvery soils. (S&W112-I, BMP 13.9)

F19 Steep, Class IV, V-notch Streams: Establish no-harvest buffers along steep, Class IV, v-notch streams with high erosion potential (S&W112-I, BMP 12.6 and 13.16)

TIMBER

T1 Maintain Advance Regeneration: Maintain advance regeneration within the unit to meet reforestation needs and stand objectives. (TIM111-2-I)

T2 Maintain Minor Tree Species: Selectively maintain minor species (e.g., yellow-cedar, western redcedar, Pacific yew), where appropriate for the site, as viable components of future stand, for vegetative diversity, and for seed trees. (TIM111-2-I, TIM114-II)

WILDLIFE & THREATENED/ENDANGERED/SENSITIVE SPECIES

W4 Reserves Under a Two-aged Harvest System: Provide for greater habitat diversity on a stand level over time by leaving reserve trees (two-aged system) as a harvest prescription (see Appendix G to Forest Plan FEIS). (WILD112 - III)

W5 Patch or Strip Clearcutting: Provide for greater habitat diversity on a stand level over time by using patch or strip clearcutting (two-aged or uneven-aged systems) as a harvest prescription (see Appendix G to Forest Plan FEIS). (WILD112-III)

W6 Selection Harvest: Provide for greater habitat diversity on a stand level over time by using the selection method (uneven-aged system) as a harvest prescription (see Appendix G to Forest Plan FEIS). (WILD112 - III)

E – Mitigation Measures

W7 Leaving Non-merchantable Trees and Snags: Provide for greater habitat diversity on a stand level over time by leaving most non-merchantable trees and snags after harvest. (WILD112 - III)

W8 Restrictions on Helicopter Yarding: Modify helicopter yarding routes and/or timing of helicopter activity to avoid important wildlife habitats (e.g., mountain goat summer/kidding habitat or active eagle nest sites. (WILD112-XII)

W10 Protection of Goshawk Nests: Avoid harvest and road construction near confirmed and probable northern goshawk nest sites according to Forest-wide Standard & Guideline TE&S-II,J,1. (TE&S-II)

W11 Timing of Activities and Disturbance at Goshawk Nests: Avoid continuous disturbance within 600 feet of an active goshawk nest from March 15 to August 15 (TE&S-II).

W12 Management of Goshawk Foraging Habitat: Maintain important features of forest stand structure in harvest units in order to manage goshawk foraging habitat according to Forest-wide Standard & Guideline TE&S-II,J,4. (this applies to certain VCUs on Prince of Wales Island) (TE&S-II)

W13 Protection of Bald Eagle Nest Trees/Other Sites and Timing of Activities: Avoid all activity, modify unit or road design, and/or limit timing of activities, near bald eagle nest trees, perch trees, and winter roost sites in accordance with the Interagency Agreement established with the U.S. Fish and Wildlife Service. (WILD112-V)

W16 Protection of Marbled Murrelet Nests: Maintain a 600-foot, generally circular, radius of undisturbed forest habitat surrounding identified marbled murrelet nests, where available. (WILD112-XII)

W17 Timing of Activities and Disturbance of Nesting Murrelets: Minimize disturbance activities within 600 feet of marbled murrelet nests during the nesting season (May 1 - August 15). (WILD112-XII)

W21 Protection of Heron Rookeries and Raptor Nests: Protect active heron rookeries and raptor nests (bald eagle, northern goshawk and osprey are covered by other measures) by providing 600-foot windfirm buffers, where available. (WILD112-X)

W22 Timing of Activities and Disturbance of Herons and Raptors during Nesting: Minimize disturbance of heron rookeries and raptor nests, by restricting development activities to periods outside the active nesting season (generally March 1 to July 31). (WILD112-X)

W28 Management of Marten Habitat: Maintain important features of forest stand structure in harvest units in order to manage high value marten habitat according to Forest-wide Standard & Guideline WILD112-XVI,A,2. (this applies to VCUs in higher risk biogeographic provinces). (WILD112-XVI)

W33 Corridors Between Old-Growth Habitat Reserves: Avoid harvest in order to maintain corridors of old-growth forest between old-growth habitat reserves and other natural setting LUDs at the landscape scale. (WILD112-XVIII)

HERITAGE RESOURCES

H1 Avoid Direct Effects on Heritage Resource Sites: Avoid road construction or harvest unit placement in areas with heritage resource value. (HER - IV)

E – Mitigation Measures

H2 Avoid Indirect Effects on Heritage Resource Sites: Provide for protection from indirect effects on heritage resource sites near proposed harvest units and roads. (HER - V4)

H3 Mitigation through Data Recovery: Mitigate valuable heritage resource sites through data recovery. (HER - IV)

RECREATION AND TOURISM

R2 Access Improvement for Recreation: Open roads after project implementation to take advantage of opportunities created by new access. (REC112-II)

R3 Recreation Enhancement: Enhance existing and/or provide additional recreation activities, opportunities, and services, to meet demands. (REC112-II)

SCENERY

V1 Clearcutting with Reserves: Reduce visual contrast with adjacent areas by using clearcutting with reserve trees (even-aged system) as a harvest prescription (see Appendix G to Forest Plan FEIS). (VIS11 - III)

V4 Reserves Under a Two-aged Harvest System: Reduce visual contrast with adjacent areas by leaving reserve trees under a two-aged system as a harvest prescription (see Appendix G to Forest Plan FEIS). (VIS11-III)

V5 Patch/Strip Clearcutting: Reduce visual contrast with adjacent areas by using patch or strip clearcutting (two-aged or uneven-aged systems) as a harvest prescription (see Appendix G to Forest Plan FEIS). (VIS11-III)

V6 Selection Harvest: Reduce visual contrast with adjacent areas by using the selection method (uneven-aged system) as a harvest prescription (see Appendix G to Forest Plan FEIS). (VIS11 - III)

V7 Leaving Non-merchantable Trees: Reduce visual contrast with adjacent areas by leaving most non-merchantable trees after harvest. (VIS11 - III)

V8 Modification of Unit Boundaries: Modify unit boundaries to assure that the harvest unit meets the proposed VQO in partial retention and retention areas. (VIS11-II)

V9 Treatment of Rock Sources: Locate rock sources off the road along Visual Priority Routes, so that rock source development is not apparent from the road and/or use a landscape architect in the planning/design of rock pits. (VIS11-II)

V10 Roadside Cleanup: Provide for roadside cleanup of ground-disturbing activities in partial retention and retention areas. (VIS11-II)

SUBSISTENCE

S1 Access Restrictions for Subsistence: Close or restrict access on roads to maintain remoteness of areas after harvest to address subsistence issues. (SUB-I)

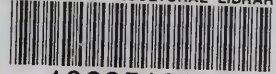
S2 Access Improvement for Subsistence: Open roads after project implementation to address subsistence issues. (SUB-I)

E - Mitigation Measures

Mitigation Measures by Unit and Alternative.																													
UNIT	Alt2	Alt3	Alt4	Alt5	Alt6	F1	F2	F3	F4	F6	F7	F8	F9	F10	F11	F12	F13	F14	F15	F16	F17	F18	F19	T1	T2	W1	W4	W5	W6
4	1	1		1	1										1									1	1	1	1		1
6	1	1		1	1	1	1	1							1				1				1	1	1	1	1		1
9A	1	1	1	1	1	1	1	1							1								1	1	1	1	1		1
9B	1	1		1	1	1	1	1							1								1	1	1	1	1		1
9C	1	1	1	1	1	1	1	1							1								1	1	1	1	1		1
10	1	1		1	1	1	1	1							1								1	1	1	1	1		1
16		1		1	1	1	1	1							1									1	1				1
17	1	1	1	1	1	1	1	1					1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		1
18	1	1		1		1	1	1							1				1				1	1	1	1	1		1
19	1	1		1				1							1								1	1	1	1	1		1
23	1	1		1	1			1							1								1	1	1	1	1		1
24	1	1		1	1	1	1	1	1						1				1				1	1	1	1	1		1
24B			1					1							1								1	1	1	1			
PC1	1	1		1	1	1	1	1	1						1				1				1	1	1	1	1		1
PC2	1	1		1	1	1	1	1	1						1				1				1	1	1	1		1	
Road																													
50055			1	1	1					1	1	1	1	1			1	1			1	1							

E - Mitigation Measures

UNIT	W7	W8	W10	W11	W12	W13	W16	W17	W21	W22	W28	W33	H1	H2	H3	R2	V1	V4	V5	V6	V7	V8	V9	V10	S1	S2
4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		1	1	1				
6	1	1				1	1	1	1	1	1	1	1	1	1	1	1	1		1	1	1				
9A	1	1				1	1	1	1	1	1	1	1	1	1	1	1	1		1	1	1				
9B	1	1				1	1	1	1	1	1	1	1	1	1	1			1	1	1	1				
9C	1	1				1	1	1	1	1	1	1	1	1	1	1		1	1	1	1	1				
10	1	1				1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1				
16												1	1	1	1	1										
17	1	1							1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
18	1	1							1	1	1	1	1	1	1	1		1		1	1	1				
19	1										1	1	1	1	1	1	1	1	1	1	1	1				
23	1	1				1			1	1	1	1	1	1	1	1	1	1	1	1	1	1				
24	1	1				1	1	1	1	1	1	1	1	1	1	1		1		1	1	1				
24B	1	1				1	1	1	1	1	1	1	1	1	1	1					1	1				
PC1	1	1				1			1	1	1	1	1	1	1	1			1		1	1				
PC2	1	1				1			1	1	1	1	1	1	1	1			1		1	1				
Road																										
50055													1	1	1	1	1							1	1	1



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